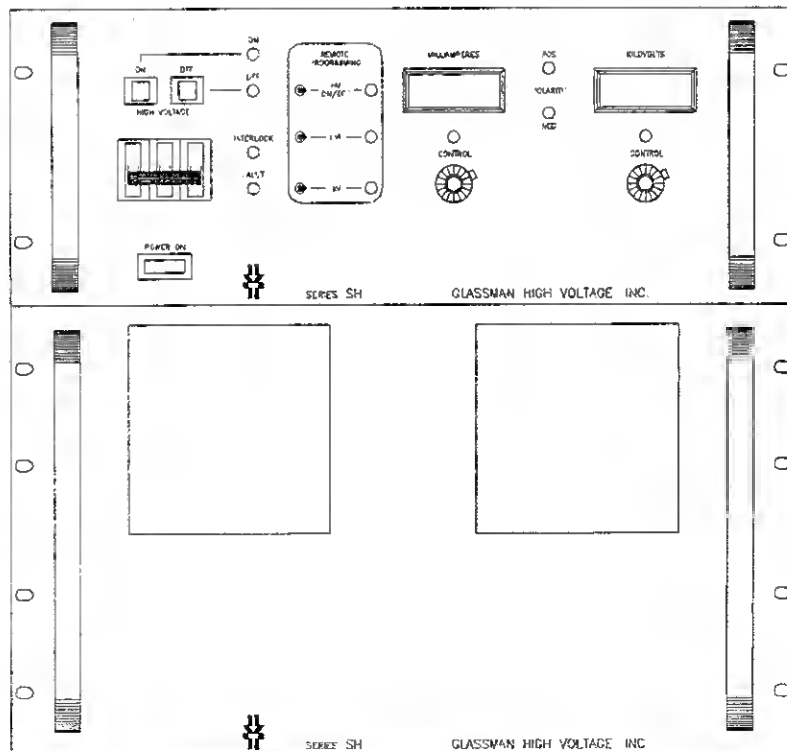


INSTRUCTION MANUAL

SH SERIES



SERIAL #: N144732-01
MODEL: P8/SH001R18.0
DATE: 2/14/06



Innovations in high voltage power supply technology

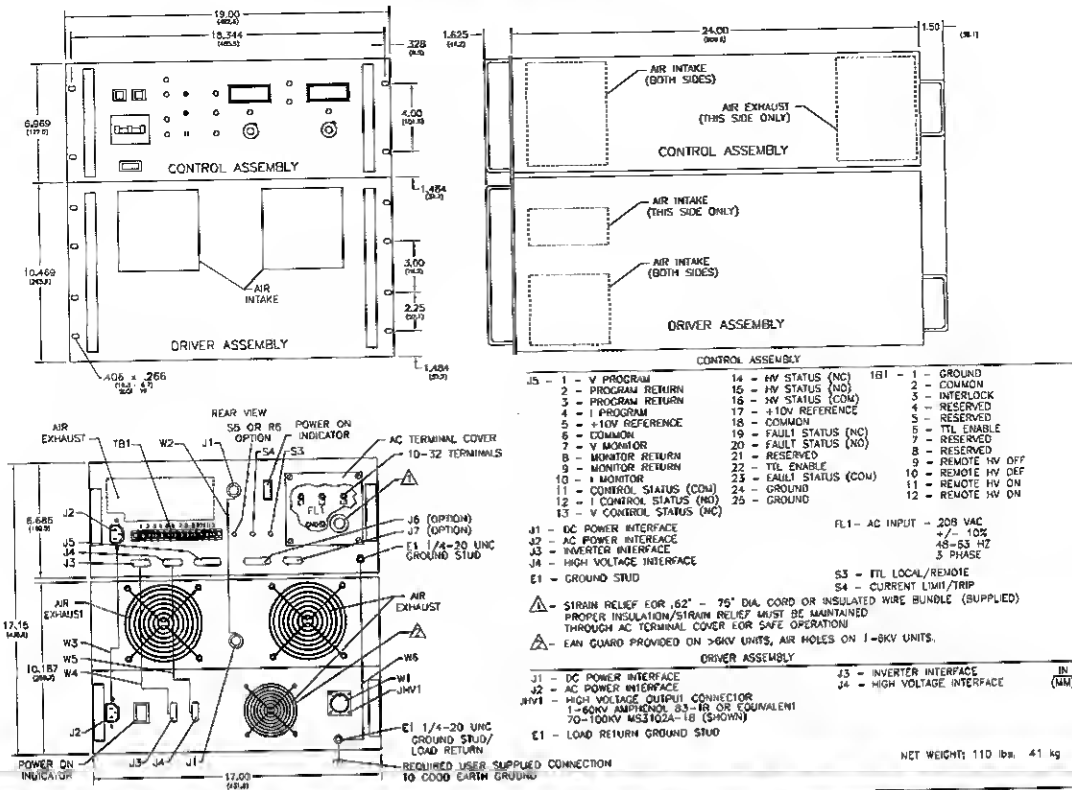
GLASSMAN HIGH VOLTAGE INC.

124 West Main Street P O Box 317

High Bridge N.J. 08829

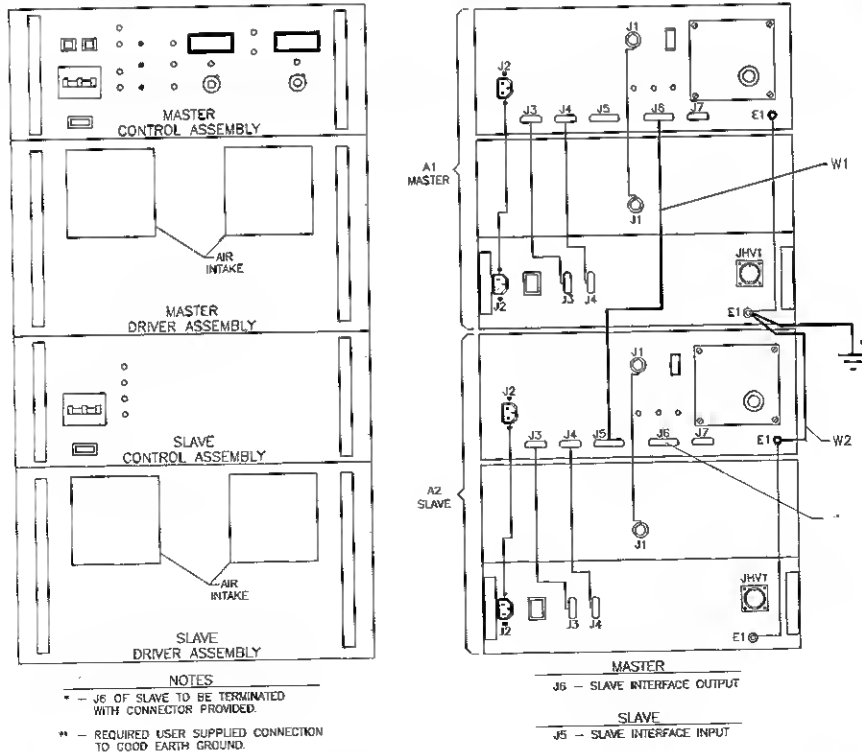
(908) 638-3800 * FAX (908) 638-3700 * www.GlassmanHV.com

8 kW Models



16 kW Models

SEE MAIN OUTLINE DRAWING FOR ALL OTHER CONNECTIONS



SHI6KW.DWG



Designing Solutions for High Voltage Power Supply Applications

GLASSMAN HIGH VOLTAGE INC.

124 West Main Street, PO Box 317, High Bridge, NJ 08829-0317
(908) 638-3800 • Fax (908) 638-3700 • www.glassmanhv.com

Specifications

Specifications for 8 kW Power Supplies

(Specifications apply from 5% to 100% of rated voltage. Operation is guaranteed down to zero with a slight degradation of performance.)

(For 16 kW power supplies, unless otherwise indicated, the performance specification limits could be increased by a factor of up to 30%. For power supplies over 16 kW, consult the factory.)

Input: 187-228 V rms, three-phase, 48-63 Hz, 11,500 VA maximum at full load (less than 35 A per phase). Inrush current is less than 45 A with a nominal decay time constant of 60 ms. Four 10-32 studs for AC line connection with a safety cover and strain relief are provided. For systems 16 kW and greater, a separate AC input connection is required for each additional slave chassis.

Mains service must be protected with fuses or circuit breakers with a maximum rating of 125 A and a minimum interrupting capacity of 50,000 A.

Efficiency: Typically 85% at full load.

Output: Continuous, stable adjustment from 0 to rated voltage/current by means of panel-mounted 10-turn potentiometers (0.05% resolution), or external 0 to +10 V signals. Repeatability better than 0.1% of setting.

Voltage programming accuracy: 0.5% of setting + 0.2% of rated output.

Resolution is a function of the programming method used.

Voltage and current external programming are differentially coupled with a maximum common mode voltage of ± 3 VDC.

Voltage Regulation: Better than $\pm 0.005\%$ for specified line variations and $0.01\% + 10$ mV/A for no load to full load variations.

Current Regulation: From short circuit to rated voltage at any load condition:

- 1 kV to 6 kV: Better than 0.5%
- 8 kV to 100 kV: Better than 0.2%

Voltage Monitor: 0 to +10 V equivalent to 0 to rated voltage. Accuracy: 0.5% of reading + 0.2% of rating. Output impedance is 10 k Ω , differentially coupled.

Current Monitor: 0 to +10 V equivalent to 0 to rated current. Accuracy:

- 1 kV to 6 kV: 1.5% of reading plus 0.5% of rated output
- 8 kV to 100 kV: 1% of reading plus 0.2% of rated output

Output impedance is 10 k Ω , differentially coupled.

Ripple: Better than 0.025% of rated voltage +1 V RMS at full load.

Stored Energy: See Models chart.

Stability: 0.01% per hour after 1/2 hour warm-up; 0.05% per 8 hours.

Voltage Rise Time Constant: 200 ms for 8 kV to 100 kV models and 50 ms for 1 kV to 6 kV models, typical, using either HV enable or remote programming control.

Voltage Decay time constant: Decay time constant is a function of the applied load. The decay time constant will be equal to the rise time constant with a minimum load of 5% of rated maximum.

Temperature Coefficient: 0.01%/°C.

Ambient Temperature: -20 to +40°C operating; -40 to +85°C storage.

Polarity: Available with either Positive Negative or Reversible polarity with respect to chassis ground.

Protection: Automatic current regulation protects against all overloads, including arcs and short circuits. Thermal switches and rpm sensing fans protect against thermal overload. Circuit breaker fuses, surge-limiting resistors, and low energy components provide ultimate protection.

Arc Quench: Optional on models 1 kV through 6 kV; standard on models 8 kV through 100 kV. An arc quench feature provides sensing of each load arc and quickly inhibits the HV output for approximately 20 ms after each arc.

Arc Sensing: Optional on models 1 kV through 6 kV; standard on models 8 kV through 100 kV. Internal circuitry senses the number of arcs caused by external load discharges. If the rate of consecutive arcs exceeds approximately one arc per second for five arcs, the supply will turn off for approximately five seconds to allow clearance of the fault. After this period, the supply will return automatically to the programmed output voltage value with the voltage rise time constant indicated. If the load fault still exists, the above cycle will be repeated.

Current Limit: In current limit mode, the power supply will regulate the load current at the programmed current level with automatic crossover between voltage and current regulating modes.

Current Trip: A switch located on the rear of the control panel assembly allows the selection of current limit or current trip operation. When the switch is set to current trip mode, the HV output will disable and latch off when the load current reaches the programmed current level. Reset is accomplished by either cycling the AC power, toggling the HV enable signal, or by pushing the HV off/reset and then the HV on switches.

Front Panel Elements: The front panel contains all local control functions and remote/local selector switches. These control functions are: AC power on/off circuit breaker and indicator light, separate 10-turn controls with locking vernier dials used to set voltage and current levels, high voltage on switch, and high voltage off/reset switch. LEDs indicate: when high voltage is on, output polarity, interlock fault status, and whether the supply is operating in a voltage or current regulating mode. Output levels are indicated by voltage and current digital meters. Remote/local switches are provided for voltage and current programming and HV on/off functions.

Slave Front Panel Elements: (When applicable) AC power breaker/switch, and indicator. Bias tracking (overvoltage) and thermal overload/low fan speed indicators. Slave current and voltage service test points.

Remote Control Interface: All standard SH family power supplies provide a user's remote interface. The signals provided are:

Safety interlock, output voltage and current program signals, high voltage enable and connections for remote HV on and off pushbuttons.

Outputs:

Output voltage and current monitor signals, HV enable status, I/V regulation mode status, fault status, and a +10 V reference source.

Signal common and ground reference terminals are also provided.

Toggle switches on the rear of the control chassis select either current limit or current trip operation and local or remote HV enable.

External Interlock: Open = off, closed = on. Normally latching except for NC option supplies where it is non-latching. The interlock indicator LED is lit when the interlock is open.

HV Enable:

Remote Mode: 0 - 15 V = OFF;
2.5 - 15 V = ON.

Local Mode: The HV output is permanently enabled.

HV Enable, Fault and I/V Regulation Status: Each are a set of form C relay contacts.

Accessories: Detachable 8 foot shielded high voltage coaxial cable provided. Models 16 kW and above are provided with an additional HV cable per slave module. A 25 pin D-subminiature connector for customer interface is provided. All chassis interconnection cables are provided.

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WARRANTY

Glassman High Voltage, Inc (Glassman) warrants standard power supplies it manufactures to be free from defect in materials and factory workmanship, and agrees to repair or replace any standard power supply that fails to perform as specified within three years after date of shipment. OEM and modified standard power supplies are warranted, as stated above, for one year from date of shipment. This Warranty shall not apply to any power supply that has been:

- i) repaired, worked on or altered by persons unauthorized by Glassman in such a manner as to injure, in Glassman's sole judgment the performance, stability or reliability of the power supply;
- ii) subjected to misuse, negligence, or accident; or
- iii) connected, installed, adjusted, or used otherwise than in accordance with instructions furnished by Glassman.

Glassman reserves the right to make any changes in the design or construction of its power supply at any time without incurring any obligation to make any change whatever in units previously delivered.

Glassman's sole liabilities, and buyer's sole remedies, under this agreement shall be limited to a refund of the purchase price, or at Glassman's sole discretion, to the repair or replacement of any power supply that proves, to Glassman's satisfaction, to be defective when returned to the Glassman factory, transportation prepaid by the buyer, within the warranty period. Glassman shall in no way be liable for damages consequential or incidental to defects in any power supply for failure of delivery in whole or in part, for injuries resulting from its use or for any other cause.

THIS WARRANTY IS EXCLUSIVE AND IS GIVEN AND ACCEPTED IN LIEU OF (1) ANY AND ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND (2) ANY OBLIGATION, LIABILITY, RIGHT, CLAIM OR REMEDY IN CONTRACT OR TORT.

This Warranty and the writing attached constitute the full understanding of the manufacturer and buyer, and no terms, conditions, understanding, or agreement purporting to modify or vary the terms hereof shall be binding unless hereafter made in writing and signed by an authorized official of Glassman High Voltage Inc.

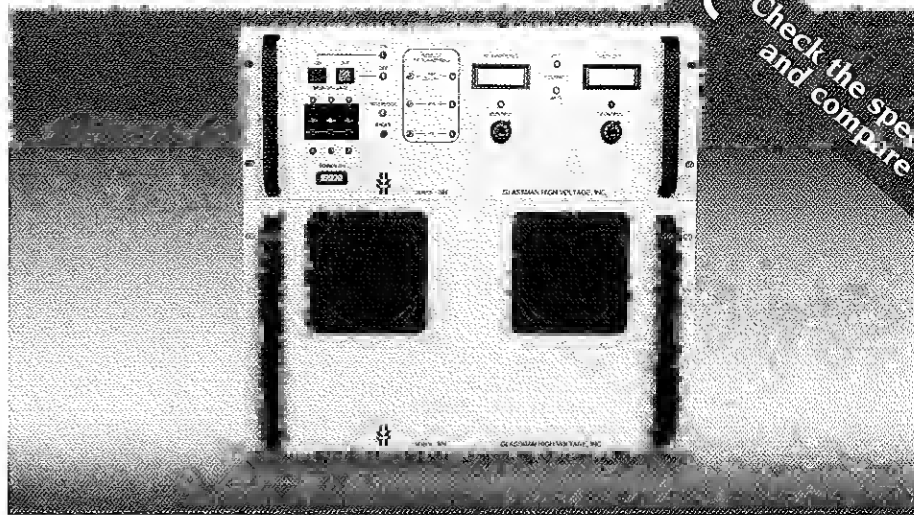
SH Series 8 kW to 40 kW Regulated High Voltage DC Power Supplies

1 kV to 100 kV Rack Mount

CE and Semi S2-93 Compliant

The SH family of power supplies are sophisticated 8 kW through 40 kW high voltage power supplies with low ripple and noise. They are air insulated fast response units with tight regulation and extremely low arc discharge currents.

Fully Compliant With The European harmonized EMI directive and with the low voltage directive 73/23/EEC



Models from 0 to 1 kV through 0 to 100 kV
8kW models are 17.5 H x 24.0" D Weight is only 110 lbs

Features:

Arc Quench The HV output is inhibited for a short period after each load arc to quickly extinguish the arc

Arc Sensing Internal circuitry constantly senses and integrates arcs that occur over a given time. In the event a system or load arcing problem develops and exceeds factory-set parameters, the power supply will cycle off in an attempt to clear the fault and then automatically restart after a preset off dwell time.

Pulse-Width Modulation Off-the-line pulse-width modulation provides high efficiency and a reduced parts count for improved reliability.

Air Insulated The SH Series features air as the primary dielectric medium. No oil or encapsulation is used to impede serviceability or increase weight.

Constant Voltage/Constant Current Operation Automatic crossover from constant-voltage to constant-current regulation provides protection against overloads, arcs, and short circuits.

Current Trip This feature may be substituted for constant-current operation by a rear panel selector switch.

Redundant Thermal Overload Protection Thermostats and tachometer fan RPM sensing shut down the power supply due to over temperature or reduced fan speeds.

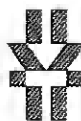
Low Ripple Typically ripple is less than 0.025% rms of rated voltage at full load.

Tight Regulation Voltage regulation is typically better than 0.01% for allowable line and load variations. Current regulation is better than 0.1% from short circuit to rated voltage.

Higher Power Capability Power supply modules can be paralleled up to 40 kW output power utilizing one master control module and up to four slave modules.

Differentially Coupled Analog Control Signals All voltage and current programming and monitoring signals are coupled to the user interface by true differential amplifiers. This provides for the ability to return the program and monitor commons to ground or system common at the source. This arrangement isolates the return wires and eliminates errors due to unwanted return currents flowing in these connections.

Warranty Standard power supplies are warranted for three years; OEM and modified power supplies are warranted for one year. A formal warranty statement is available.



Designing Solutions for High Voltage Power Supply Applications

GLASSMAN HIGH VOLTAGE INC.

124 West Main Street, PO Box 317, High Bridge, NJ 08829-0317
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E-mail: Glassman_europe@glassmanhv.com

GLASSMAN JAPAN High Voltage Limited
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E-mail: Glassman_japan@glassmanhv.com

Options

Symbol Description

ZR	Zero start interlock	Voltage control local or remote must be at zero before HV will enable
SS	Slow start ramp	Specify standard times of 5 10 15 20 or 30 seconds \pm 20%
5VC	0-5 V voltage and current program/monitor	
NC	Blank front panel	Panel contains AC power breaker/switch and indicator HV ON HV OFF interlock and fault indicators and output current and voltage service test points
ARC	For 1 to 6 kV models	Arc quench and arc sensing are provided as described in specifications for 8 to 100 kV models
GE9	RS-232 control and monitor	

Please consult factory for special requirements

8 kW Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy (J)	Output Cable
Reversible Polarity Only		SH1R8.0	0 – 1kV	0 – 8.0A	8	RG-8U
		SH1.5R5.3	0 – 1.5kV	0 – 5.3A	7.8	RG-8U
		SH2R4.0	0 – 2kV	0 – 4.0A	7.5	RG-8U
		SH3R2.7	0 – 3kV	0 – 2.7A	8	RG-8U
		SH5R1.6	0 – 5kV	0 – 1.6A	7	RG-8U
		SH6R1.3	0 – 6kV	0 – 1.3A	8	RG-8U
SH8P1.0	SH8N1.0	SH8R1.0	0 – 8kV	0 – 1000mA	10	RG-8U
SH10P800	SH10N800	SH10R800	0 – 10kV	0 – 800mA	12	RG-8U
SH12P670	SH12N670	SH12R670	0 – 12kV	0 – 670mA	12	RG-8U
SH15P530	SH15N530	SH15R530	0 – 15kV	0 – 530mA	10	RG-8U
SH20P400	SH20N400	SH20R400	0 – 20kV	0 – 400mA	18	RG-8U
SH25P320	SH25N320	SH25R320	0 – 25kV	0 – 320mA	13	RG-8U
SH30P270	SH30N270	SH30R270	0 – 30kV	0 – 270mA	18	RG-8U
SH40P200	SH40N200	SH40R200	0 – 40kV	0 – 200mA	16	RG-8U
SH50P160	SH50N160	SH50R160	0 – 50kV	0 – 160mA	20	RG-8U
SH60P130	SH60N130	SH60R130	0 – 60kV	0 – 130mA	24	RG-8U
SH70P110	SH70N110	SH70R110	0 – 70kV	0 – 110mA	28	DS2121
SH80P100	SH80N100	SH80R100	0 – 80kV	0 – 100mA	32	DS2121
SH100P80	SH100N80	SH100R80	0 – 100kV	0 – 80mA	40	DS2121

16 kW Models

Positive Polarity	Negative Polarity	Reversible Polarity	Output Voltage	Output Current	Stored Energy (J)	Output Cable
Reversible Polarity Only		SH1R16.0	0 – 1kV	0 – 16.0A	16	2X RG-8U
		SH1.5R10.6	0 – 1.5kV	0 – 10.6A	15.6	2X RG-8U
		SH2R8.0	0 – 2kV	0 – 8.0A	15	2X RG-8U
		SH3R5.4	0 – 3kV	0 – 5.4A	16	2X RG-8U
		SH5R3.2	0 – 5kV	0 – 3.2A	14	2X RG-8U
		SH6R2.6	0 – 6kV	0 – 2.6A	16	2X RG-8U
SH8P2.0	SH8N2.0	SH8R2.0	0 – 8kV	0 – 2.0A	20	2X RG-8U
SH10P1.6	SH10N1.6	SH10R1.6	0 – 10kV	0 – 1.6A	24	2X RG-8U
SH12P1.3	SH12N1.3	SH12R1.3	0 – 12kV	0 – 1.3A	24	2X RG-8U
SH15P1.06	SH15N1.06	SH15R1.06	0 – 15kV	0 – 1060mA	20	2X RG-8U
SH20P800	SH20N800	SH20R800	0 – 20kV	0 – 800mA	36	2X RG-8U
SH25P640	SH25N640	SH25R640	0 – 25kV	0 – 640mA	26	2X RG-8U
SH30P540	SH30N540	SH30R540	0 – 30kV	0 – 540mA	36	2X RG-8U
SH40P400	SH40N400	SH40R400	0 – 40kV	0 – 400mA	32	2X RG-8U
SH50P320	SH50N320	SH50R320	0 – 50kV	0 – 320mA	40	2X RG-8U
SH60P260	SH60N260	SH60R260	0 – 60kV	0 – 260mA	48	2X RG-8U
SH70P220	SH70N220	SH70R220	0 – 70kV	0 – 220mA	56	2X DS2121
SH80P200	SH80N200	SH80R200	0 – 80kV	0 – 200mA	64	2X DS2121
SH100P160	SH100N160	SH100R160	0 – 100kV	0 – 160mA	80	2X DS2121

For Models Greater Than 16 kW, Please Consult Factory.



Declaration of Conformity

Declaration of Conformity
according to EMC Directive 89/336/EEC
and Low Voltage Directive 73/23/EEC

Manufacturers Name: Glassman High Voltage, Inc
Manufacturers Address: PO Box 317
124 West Main Street
High Bridge, NJ 08829-0317
USA

Manufacturer declares that the **SH Series** Power Supplies
conform to the following Product Specifications:

EMC:	EN 55011 class A	EN 61000-4-2 - 4kV CD, 8kV AD
	EN 61000-4-3 - 10V/m	ENV 50204 - 10V/m
	EN 61000-4-6 - 10V RMS	EN 61000-4-4 - 1kV Signal Cable, 2kV AC Mains

LV Directive: EN 61010-1:

Environmental conditions: Indoor use
Altitude up to 2000 meters
Temperature 5 deg C to 40 deg C
Humidity 80% maximum
Input Mains Fluctuations +/-10%
Installation Category II per IEC1010-1, paragraph 1 4 & annex J
Pollution Degree 2 per IEC1010-1, paragraph 3.7.3

Means Of Conformity:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC based on the use of a Technical Construction File (TCF) in accordance with Article 10.2 of the Directive.
The product herewith also complies with the requirements of the Low Voltage Directive 73/23/EEC based on design analysis and testing in accordance with Article 13, Annex IV of Directive 93/68/EEC, amending Directive 73/23/EEC.



Technical

Construction File:

Prepared by: Steven De Clario
Function: Electrical Engineer
Company: Glassman High Voltage, Inc
PO Box 317
124 West Main Street
High Bridge, NJ 08829-0317
USA
TCF number: 40122SH.TCF
Date: April, 2000

Competent Body: NMI Certin B.V.
P.O. Box 15
9822 ZG Niekerk
The Netherlands

Signature:

Function: Staff Engineer
Date: April 10, 2000

EC Representative:

Glassman Europe Limited, 21 Campbell Court, Campbell Road, Bramley,
Tadley, Hampshire RG265EG, England.



EMC Directive Addendum

For SH models with CE option.

Your high voltage power supply has been designed and tested to ensure compliance with the European Community's EMC directives when used as described in the instruction manual. However, as we do not supply as standard remote interface cables, the following precautions must be followed in order to ensure continued compliance with EMC directive radiated emissions requirements as specified in the harmonized standard EN55011:1991 Group 1, Class A

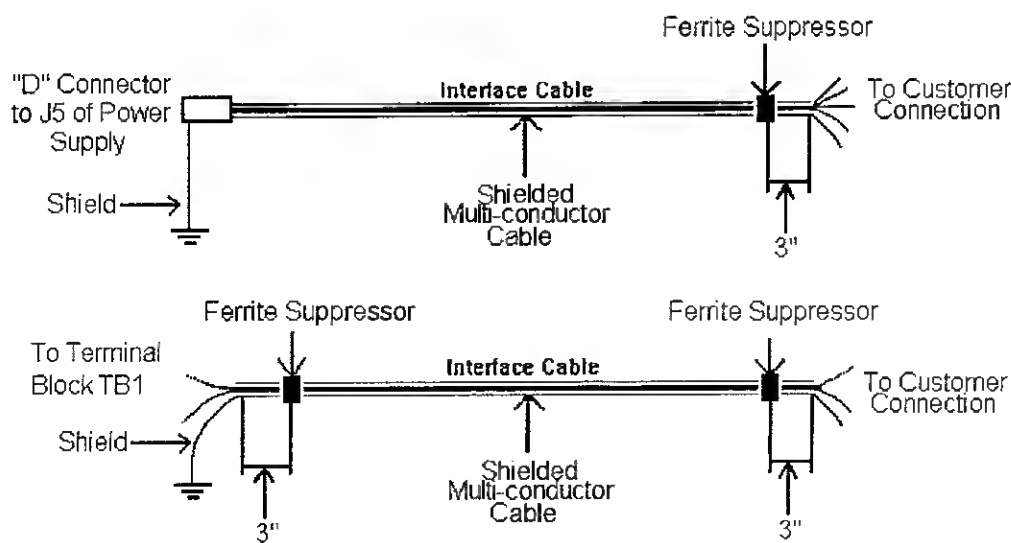
- 1 The remote interface cables must be of a shielded type with the shields and connector housings terminated to an adequate ground source at both ends of the cable. At the power supply end, Pin 1 of TB1 provides a ground connection for the terminal block interface cable shield, and Pin 24 or 25 of J5 or the "D" connector housing provides a ground connection for the "D" connector interface cable shield.
- 2 A ferrite suppressor must be placed at both ends of the TB1 cable and at the customer end of the "D" connector cable over the shields. These suppressors must be located within 3" of the terminations of each end of the cables (see drawing below). The ferrite suppressors should have the following properties:

Impedance should be greater than 200 ohms at 100MHz.

For your convenience, we have made available kits that contain the required ferrite suppressors for each cable. Contact your Glassman representative for further information.

If your power supply is a modified standard and contains any additional interface connectors, each additional interface cable must follow the same precautions as stated above.

Please note that if the digital panel meters are subjected to radiated EMC fields in excess of 3V/m the display value may read incorrectly. However, the actual HV output remains stable and the true HV output level can be read from the voltage monitor.



UNPACKING AND INSPECTION

First inspect package exterior(s) for evidence of rough handling in transit. If none, proceed to unpack carefully. After removing the supply from its shipping container, inspect it thoroughly for damage.

IMPORTANT! In cases of damage due to rough handling in transit, notify the carrier immediately if damage is evident from appearance of package. Do not destroy or remove any of the packing material used in a damaged shipment. Carrier companies will usually not accept claims for damaged material unless they can inspect the damaged item and its associated packing material. Claims must be made promptly - certainly within five days of receipt of shipment.

CORRESPONDENCE

Each Glassman power supply has an identification label on the chassis that bears its model and serial number. When requesting engineering or applications information, reference should be made to this model and serial number. If specific components or circuit sections are involved in the inquiry, also indicate the component symbol number(s) shown on the applicable schematic diagram.

GLASSMAN HIGH VOLTAGE, INC
PO Box 317
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High Bridge, N.J. 08829

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FAX 908-638-3700
E-MAIL Support@GlassmanHV.com
www.GlassmanHV.com

SAFETY

This symbol, wherever it appears on the supply, alerts you to the presence of uninsulated dangerous voltages - voltages that may be sufficient to constitute a risk of electrical shock



This symbol, wherever it appears on the supply, alerts you to important operating and maintenance instructions in the accompanying literature. Read the manual.

TERMS IN THIS MANUAL

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING! statements identify conditions or practices that could result in injury or loss of life

WARNING!

To avoid the risk of shock or fire do not attempt to service the supply beyond that described in these instructions.

To avoid the risk of shock and personal injury, do not remove the product covers while the unit is operating or connected to the AC mains. Wait at least 2 minutes after disconnecting the AC mains power before removing any covers or panels. Wait at least 15 seconds before disconnecting the HV cable.

Upon loss of protective ground connection(s), all accessible conductive parts can render an electric shock.

Use only a power cord rated greater than the input current rating of the unit.
Use only a cord in good condition.

To avoid fire hazard, use only fuses of the correct type, voltage rating, and current rating as specified.

To avoid explosion, do not operate this product in an explosive atmosphere.

If liquid is spilled on the supply, shut it off immediately and disconnect it from the AC mains.

Always maintain adequate supply ventilation. All ventilation openings must remain free from obstruction.



PREPARATION FOR USE

The power Supply consists of two chassis assemblies, the control chassis and the driver chassis. All input and interface connections are made to the control assembly. The HV output is provided on the driver assembly (Refer to the Outline and Installation Drawing included with this manual.)

CAUTION: All interconnections between the driver and control chassis must be installed with the cables provided before AC line power is applied.

LINE VOLTAGE

This supply is capable of continuous operation using input voltages of 208 VAC $\pm 10\%$, 3 phase, 48-63 Hz

INPUT POWER

Four 10-32 terminals (L1, L2, L3 & GND) located on the line filter FL1 are provided at the rear of the control module, behind a removable cover plate, for connection to three phase AC power. The power cord employed should contain wires capable of supplying at least 40 amperes RMS each. A compression strain relief bushing is provided for securing a round AC input cord with an outside diameter of from .62" to .75". This bushing is installed in a 3/4 NPT hole provided in the cover plate. If a cord is employed that differs from the above style and diameter, the user must replace the bushing provided with one appropriate for the application. Master/Slave supplies have one additional set of AC input terminals per slave control chassis. A separate line cord must be provided for each control module.

MAINS SERVICE MUST BE PROTECTED WITH FUSES OR CIRCUIT BREAKERS WITH A MAXIMUM RATING OF 125 A AND A MINIMUM INTERRUPTING CAPACITY OF 5,000 A

Note: When installing, thread the power cord through the strain relief bushing before making connections to FL1. After making the connections move the cover into position and secure with the 4 captive screws. Then tighten the compression strain relief. It is recommended that some means be provided for disconnecting the unit(s) from the mains, such as an appropriate plug/jack combination or a distribution box with safety switch or circuit breaker.

Caution: The protective cover plate must be installed and the terminal marked "GND" must be connected to a good earth ground for electrical shock protection. In Europe, this ground wire must be green/yellow in color.

For CE compliant supplies used in Europe:

Please refer to the Declaration of Conformity located elsewhere in this manual for installation environment conditions required to conform to 73/23/EEC (Low Voltage Directive).

AC POWER BREAKER/SWITCH

The breaker/switch is located on the front panel of the control chassis. In addition, on master/slave systems, there is one breaker on each slave control chassis.

INSTRUMENT COOLING

Always maintain adequate supply cooling. All ventilation holes must remain free from obstruction.

REVERSE POLARITY

Reverse Polarity Supplies $\leq 6\text{kV}$ (standard):

A polarity card is provided, internal to the unit, to reverse the output polarity of the supply. If it is desired to determine the present setting of the polarity or to change the polarity, follow the procedure below (refer to the AM10-SH parts placement drawing):

WARNING:

TO AVOID THE RISK OF SHOCK AND PERSONAL INJURY, WAIT AT LEAST 2 MINUTES AFTER DISCONNECTING THE AC MAINS POWER BEFORE REMOVING ANY COVERS OR PANELS.

1. Remove the bottom cover from the driver chassis.
BE SURE AC POWER IS DISCONNECTED AND HV IS DISCHARGED!
2. Locate the high voltage board A4-1 mounted towards the rear section of the chassis (as viewed from the front).
3. Locate the polarity card (A4-2) plugged into the high voltage board and observe that the card is labeled to indicate the installed polarity.
4. If it is desired to change the polarity of the supply, simply unplug the card, flip it over and reinstall it carefully. Make sure the card is fully inserted (seated).
5. Replace the bottom cover.
6. Repeat the above procedure (if applicable) for all slaves in master/slave systems.

CAUTION: All polarity cards in master/slave systems must be installed for the same polarity. The supplies will not operate if this is not the case.

Reverse Polarity Supplies $> 6\text{kV}$ (optional):

Two high voltage assemblies are provided with each supply (and slave where applicable): one is mounted in the supply (normally the positive one), the other one is shipped separately. To verify the polarity of the assembly installed, the bottom cover may be removed from the driver assembly of the supply. **BE SURE AC POWER IS DISCONNECTED AND HV IS DISCHARGED!** The large white enclosure (the high voltage assembly) will have a label affixed to the top which indicates its polarity.

It is required that the two high voltage assemblies be exchanged to reverse the output polarity. This

may be done in the following manner (refer to the AM10-SH parts placement drawing):

WARNING!:

TO AVOID THE RISK OF SHOCK AND PERSONAL INJURY, WAIT AT LEAST 2 MINUTES AFTER DISCONNECTING THE AC MAINS POWER BEFORE REMOVING ANY COVERS OR PANELS.

- 1 If the supply has been running the output must be discharged or allowed to bleed down for a few minutes
- 2 Disconnect the AC power from the supply
- 3 Remove the high voltage cable from the supply
- 4 Remove the top & bottom covers from the driver chassis
- 5 Position the unit with the top facing up Unplug the HV AC cables from A2-J3 & A3-J2.
- 6 Turn the chassis over so that the bottom is facing up Unplug and disconnect the cable harness from A4-J1 and A4-J2. Unplug and disconnect the fastons from A4-E22 and A4-E23 Remove the nut and hardware securing the ground wire to EG3 Dress all loose wires away from the HV assembly
- 7 Remove the screws holding the rear panel behind A4 and let the panel hinge back
- 8 Carefully pull the HV AC silicone wires up through their guide tubes and let them hang free
- 9 A4 is secured to the chassis by means of an angle bracket Remove the three nuts and associated hardware holding the bracket to the chassis.
- 10 Remove A4 by lifting straight up Install the high voltage assembly of opposite polarity in its place.
- 11 Reassemble the supply in reverse order of disassembly
- 12 Repeat the above procedure (if applicable) for all slaves in master/slave systems

CAUTION:

- Nuts holding the brackets to the chassis must be installed and must be tight to provide proper grounding for A4.
- Be careful when reinstalling J1 & J2. Be sure that plugs and jacks are properly aligned and mated
- All high voltage assemblies installed in master/slave systems must be of the same polarity The supplies will not operate if this is not the case.

CONTROLS, CONNECTORS, AND INDICATORS

CONTROL CHASSIS FRONT PANEL (Refer to Outline and interface Drawings)

POWER Circuit Breaker/Switch - Turns the supply power on and off (1 / ON, 0 / OFF)

POWER ON indicator - Illuminates when the POWER Switch/Circuit Breaker is ON and the AC

input power is present

REMOTE PROGRAMMING Switches and Indicators - These switches provide a means to select certain functions as designated for remote operation (e.g. when signals for these functions are to be applied to the customer interface connectors J5 & TB1). The associated indicators will light when the switches are in the remote position (toggled to the right). The three selectable functions are:

- **REMOTE PROGRAMMING mA** - Allows the output current to be controlled with an external analog signal (front panel control is disabled)
- **REMOTE PROGRAMMING kV** - Allows the output voltage to be controlled with an external analog signal (front panel control is disabled)
- **REMOTE HV ON/OFF** - Allows for two separate external momentary switches to control the high voltage enable function (front panel HV ON & OFF switches are disabled)

INTERLOCK Indicator - Shows that an open is/was present in the customer interlock circuit. High voltage output is disabled and cannot be enabled until the open interlock is corrected (closed) and the system is re-enabled.

FAULT Indicator - Illuminates when one or more of the following fault conditions are present:

- One or more cooling fans are slow or inoperative
- Insufficient AC line voltage is present
- The power supply temperature is too high
- The main DC buss is shorted (circuit failure)
- An internal bias voltage is low or missing (circuit failure)
- There is a fault in the slave module or open master/slave interconnect cable (master/slave systems only)

HIGH VOLTAGE OFF Indicator - Illuminates when the high voltage is off. The HIGH VOLTAGE OFF indicator will remain illuminated after an attempt is made to enable the HV if one or more of the following conditions is present:

- A signal or power interconnect cable is open or disconnected
- The REMOTE HV ON/OFF switch is set for remote operation and a remote contact closure is not present at TB1-9 to TB1-10 or TB1-11 to TB1-12
- One or more cooling fans are slow or inoperative
- The main DC buss is shorted (circuit failure)
- An internal bias voltage is low or missing (circuit failure)
- There is a FAULT or OVERVOLTAGE indication in a slave module or open master/slave interconnect cable (master/slave systems only)

HIGH VOLTAGE ON Indicator - Illuminates when the high voltage is on

HIGH VOLTAGE ON Push-button - Enables the high voltage output when actuated. This push-button will NOT activate when one or more of the following conditions are present:

- The FAULT indicator is illuminated
- The REMOTE HV ON/OFF switch is set to the remote position
- There is an open interlock (INTERLOCK indicator is illuminated)

HIGH VOLTAGE OFF Push-button - Turns off the high voltage output and resets the following latching faults:

- CURRENT TRIP (if enabled by rear panel switch)
- ARC TRIP (if ARC TRIP option is factory installed)

KILOVOLT CONTROL - Sets the output voltage regulation point

0 00 = 0 00 kV

10 00 = Maximum rated output voltage

KILOVOLT CONTROL Indicator - Illuminates when supply is in the voltage regulation mode

KILOVOLT Digital panel meter - Displays output voltage in kilovolts (unless otherwise specified)

MILLIAMPERE/AMPERE CONTROL - Sets the output current regulation point

0 00 = 0 00 mA or A

10 00 = Maximum rated output current

MILLIAMPERE/AMPERE CONTROL Indicator - Illuminates when the supply is in the current regulation mode or a MILLIAMPERE FAULT has occurred.

MILLIAMPERE/AMPERE Digital Panel Meter - Displays output current in milliamperes or amperes (unless otherwise specified)

POLARITY Indicators (POS, NEG) - Displays the polarity with respect to ground of the high voltage output

Slave Modules (Master/Slave Supplies Only):

POWER Indicator - Will light when the AC POWER circuit breaker on the slave module is in the ON / 1 position. If AC power is applied to the modules

BIAS Indicator - Is normally not illuminated when the AC power is applied. Will light if any of the following conditions are present:

- An internal bias voltage is missing
- The input AC line voltage is insufficient
- An over-temperature condition has occurred

FAN Indicator - Will illuminate when one or more cooling fans are slow or inoperative

TRACKING Indicator - This indicator will illuminate if the slave module is not tracking the master. The tracking circuit will latch and shutdown the supply if the condition persists for

more than approximately 500 mS TRACKING shutdown can only be reset by AC power-down, either by the master module power switch or by disconnecting the supply from the AC mains. It is normal for this indicator to momentarily illuminate during load or programming transients.

SYSTEM Indicator - Will illuminate if the master and slave high voltage polarities do not match (This applies only to reversible polarity supplies.)

TP-I Testpoint - A 0 to 10 V service testpoint for measuring the relative output current of a slave module.

TP-V Testpoint - A 0 to 10 V service testpoint for measuring the relative output voltage of a slave module.

TP-C Testpoint - The common return point for the instrument(s) measuring the TP-V and/or TP-I testpoints.

CONTROL CHASSIS REAR PANEL (Refer to Outline and Interface Drawings)

FL1 AC Input Filter - Input power connections are made directly to the line filter. FL1 as follows (with one additional set of connections per slave on master/slave supplies):

L1	Phase 1
L2	Phase 2
L3	Phase 3
GND	Earth Ground

For CE compliant supplies used in Europe:

Please refer to the Declaration of Conformity located elsewhere in this manual for installation environment conditions required to conform to 73/23/EEC (Low Voltage Directive).

TB1 Connector - Customer interface. Provides connections for COMMON, GROUND, INTER-LOCK, TTL ENABLE and HV ON/OFF control signals.

(explained in greater detail later)

J1, J2 J3 & J4 Connectors - Provides connections for chassis interconnect cables between control and driver chassis.

J5 Connector - Customer interface. Provides connections for remote control and monitor signals.

(explained in greater detail later)

J6 Connector - This connector provides the interface signals needed for parallel operation to J5 of the first slave chassis (only used on master/slave supplies).

J7 Connector - Unused

POWER ON Indicator - Illuminates when AC power is ON

E1 Terminal - This terminal should be connected to E1 on the driver chassis using the ground cable provided. E1 on the driver chassis should be solidly connected to a good earth ground.

Slave Modules (Master/Slave Supplies Only):

J5 Connector - This connector provides the interface signals needed for parallel operation from J6 of the master chassis or J6 of the nearest upstream slave chassis.

J6 Connector - This connector provides the interface signals needed for parallel operation to J5 of the nearest downstream slave chassis. In the case of the last slave chassis, a terminator plug is installed on J6.

E1 Terminal - Chassis GROUND This is the ground connection for the slave module and MUST be connected back to E1 of the master module, either directly or via the E1 ground terminal of the next upstream slave modules.

DRIVER CHASSIS REAR PANEL (Refer to Outline and Interface Drawings)

J1, J2 J3 & J4 Connectors - Provides connections for chassis interconnect cables between control and driver chassis.

E1 Terminal - WARNING!! E1 MUST be grounded. This is the main ground connection for the power supply system. The E1 terminal on both chassis should be connected together using the ground cable provided. E1 on the driver chassis should be solidly connected to a good earth ground.

JHV1 Connector - High voltage output (one additional output per slave for master/slave supplies).

WARNING!

DO NOT HANDLE EXPOSED HIGH VOLTAGE TERMINATIONS OR ATTEMPT TO MAKE OR REMOVE ANY CONNECTIONS TO THE SUPPLY UNTIL THE LOAD AND/OR SUPPLY HAS BEEN DISCHARGED (GROUNDED). AN UNLOADED SUPPLY MAY TAKE UP TO 60 SECONDS TO FULLY DISCHARGE.

INSTALLATION AND OPERATION

The following procedure should be followed to connect and operate the equipment after it has been placed or mounted in position.

WARNING!

NEVER ATTEMPT TO OPERATE THIS UNIT WITHOUT A GOOD EARTH GROUND CONNECTED TO THE MAIN GROUND STUD E1 ON DRIVER CHASSIS (E1 OF MASTER DRIVER CHASSIS ON MASTER SLAVE SUPPLIES).

THE LOAD RETURN SHALL ALSO BE CONNECTED TO THE MAIN GROUND STUD.

ALWAYS MAKE CERTAIN THAT MULTI-CHASSIS SUPPLIES HAVE THEIR INTER-CHASSIS GROUNDING STRAPS AND/OR BUSSBARS INSTALLED AS SHOWN IN THE INSTALLATION DRAWING(S) AND SCHEMATIC(S) SUPPLIED.

THE GROUND WIRE OF THE AC LINE CORD SHALL BE GROUNDED FROM THE AC GROUND TO FL1 GROUND (ON ALL FL1 GROUNDS FOR MASTER/SLAVE SUPPLIES)

READ AND FULLY UNDERSTAND THE OPERATING INSTRUCTIONS BEFORE APPLYING POWER TO THIS UNIT.

THIS EQUIPMENT EMPLOYS VOLTAGES THAT ARE DANGEROUS. EXTREME CAUTION MUST BE EXERCISED WHEN WORKING WITH THIS EQUIPMENT.

DO NOT HANDLE THE LOAD OR EXPOSED HIGH VOLTAGE TERMINATIONS, OR ATTEMPT TO MAKE OR REMOVE ANY CONNECTIONS TO THE SUPPLY UNTIL THE LOAD AND/OR SUPPLY HAS BEEN DISCHARGED (GROUNDED). AN UNLOADED SUPPLY MAY TAKE UP TO 60 SECONDS TO FULLY DISCHARGE.

INITIAL TURN ON

It is suggested that the operator become familiar with the operation of the unit under local (front panel) control and then add the remote functions as desired. Thus, the initial turn on sequence described below assumes that there are no signals applied to the customer interface connectors J5 & TB1 and that the common and interlock terminals are strapped together (TB1-2 TO TB1-3)

Please verify the following:

- 1 That the AC power is disconnected from the unit, either by the disconnecting of an appropriate three phase plug/jack combination or, if the supply is wired directly to the mains, by setting the power breaker or safety switch to OFF
- 2 That there are no signals applied to J5 or TB1
- 3 That a good earth ground is connected the main ground stud, E1, as described in the WARNING! statement above
- 4 That the proper grounding straps and/or bussbars have been installed between chassis as shown in the installation drawing

5. That all inter-chassis wires and cables have been installed in accordance with the schematic/interface drawings supplied
6. That the front panel switches and controls are set as follows:

POWER ON Breaker	Off / 0
REMOTE PROGRAM Switches	LOCAL (left)
KILOVOLT CONTROL	Counterclockwise
MILLIAMPERE/AMPERE CONTROL	As required for load. 1.00 = 10 % of rating 5.00 = 50 % of rating, etc
7. That the rear panel switches are set as follows:	
TTL	LOCAL (up)
CURRENT	LIMIT (up)

Attach load as follows (optional):

1. Connect the load return to the main ground stud on the driver chassis.

WARNING!

NEVER ATTEMPT TO OPERATE THIS UNIT WITHOUT A GOOD EARTH GROUND CONNECTED TO THE MAIN GROUND STUD E1 ON THE DRIVER CHASSIS (E1 OF MASTER DRIVER CHASSIS ON MASTER/SLAVE SUPPLIES).

2. Connect the HV end of the load to the high voltage output cable (stripped and tinned end) provided.
3. Insert the plug end of the high voltage cable(s) into the high voltage receptacle(s). Screw the threaded barrel onto the receptacle JHV1 on the rear panel of the driver chassis. Spring action should be felt as the probe reaches the bottom. Hold the cable pressed down against the spring as the threaded barrel is screwed onto the receptacle.

Power up sequence:

1. Make appropriate line cord connections to the power source
2. Set the POWER switch on the front panel to the ON / 1 position. The following indicators should be illuminated:
 - POWER
 - HIGH VOLTAGE OFF
 - KILOVOLT CONTROL
 - POS or NEG POLARITY

- 3 Activate the high voltage output by depressing HIGH VOLTAGE ON button. The HIGH VOLTAGE OFF lamp will extinguish and the HIGH VOLTAGE ON lamp will illuminate
- 4 Rotate KILOVOLT CONTROL clockwise until the KILOVOLT digital panel meter indicates the desired voltage. If the MILLIAMPERE/AMPERE CONTROL indicator illuminates before the desired voltage is achieved, the supply has gone into constant current mode (current limit) and the setting of the MILLIAMPERE/AMPERE CONTROL will have to be increased to supply the required current to the load, at the desired kV level
- 5 The high voltage can be turned off by depressing the HIGH VOLTAGE OFF push-button. The supply will go into the standby mode: HIGH VOLTAGE OFF lamp on, HIGH VOLTAGE ON lamp off. The high voltage can also be turned off by shutting down the supply with the POWER breaker. When the supply is again powered up, the unit will go into the standby mode.

NOTE: When the high voltage ON/OFF function is under local (front panel) control, the supply will always power-up in standby mode regardless of whether the high voltage was enabled or disabled at power-down.

WARNING!

DO NOT HANDLE THE LOAD OR EXPOSED HIGH VOLTAGE TERMINATIONS OR ATTEMPT TO MAKE OR REMOVE ANY CONNECTIONS TO THE SUPPLY UNTIL THE LOAD AND/OR SUPPLY HAS BEEN DISCHARGED (GROUNDED). AN UNLOADED SUPPLY MAY TAKE UP TO 60 SECONDS TO FULLY DISCHARGE.

REMOTE CONTROL AND MONITOR SIGNALS **(Refer to customer interface drawing)**

NOTE: It is recommended that shielded cable(s) be used for these connections and that the shield be terminated to ground.

For CE compliant supplies used in Europe:

Please refer to the EMC addendum located elsewhere in this manual for shielding, terminating filtering conditions required to conform to 89/336/EEC.

CONTROL CHASSIS TB1 CONNECTIONS:

TB1-1 GROUND

This terminal is connected directly to the chassis and is provided for cable shield termination

TB1-2 COMMON

This terminal establishes the main reference point for the supply. COMMON is connected internally to GROUND. This terminal provides a convenient return connection for INTERLOCK and TTL signals

TB1-3 INTERLOCK

This terminal must be connected to COMMON for the high voltage to be enabled. The supply is shipped with this terminal tied to the adjacent COMMON terminal by means of a terminal jumper. This jumper may be removed and a pair of wires may be installed in its place, which then may be connected to a switching device, such as a door interlock switch.

When the unit is in the standby mode (HIGH VOLTAGE OFF indicator illuminated), an open circuit at the INTERLOCK terminal will cause the INTERLOCK lamp to light. The interlock circuit will not allow the high voltage to be activated either by the front panel HIGH VOLTAGE ON button or by the REMOTE HV ON contact closure. When the INTERLOCK terminal is again connected to COMMON, the system will revert back to the normal standby condition.

If the high voltage is already enabled, an open circuit at the INTERLOCK terminal will disable the high voltage. Even if the open interlock is reconnected, the high voltage will remain off until a HIGH VOLTAGE ON command is received either by the front panel HIGH VOLTAGE ON button or by the REMOTE HV ON contact closure.

TB1-5 TTL ENABLE

This terminal is connected in parallel with J5-22. Refer to J5-22 description.

TB1-9 REMOTE HV OFF

TB1-10 REMOTE HV OFF

TB1-11 REMOTE HV ON

TB1-12 REMOTE HV ON

These terminals provide for control of the HIGH VOLTAGE ON and HIGH VOLTAGE OFF functions remotely when the front panel REMOTE HV ON/OFF switch is set to the REMOTE position. Under remote control, the front panel ON and OFF indicators will function normally, but the ON and OFF push-buttons are disabled. For remote operation, the user must provide one normally open momentary switch connected across the REMOTE HV ON terminals and one normally closed momentary switch connected across the REMOTE HV OFF terminals. Actuating the remote HV ON switch for > 50 ms turns the HV on. Actuating the remote HV OFF switch for > 50 ms turns the HV off.

Note:

- Installing a permanent connection across the REMOTE HV ON terminals will cause the supply to generate HV immediately upon the application of AC power (assuming there are no faults). In addition, if the interlock is opened disabling the HV, closure of the interlock will cause the HV to turn on immediately.
- Installing a permanent connection across the REMOTE HV OFF terminals will not allow the HV to be shut off except by the removal of AC power or the introduction of a fault or open interlock.

TB1-4 RESERVED
TB1-5 RESERVED
TB1-7 RESERVED
TB1-8 RESERVED

These terminals are reserved for special options or expansion of features

CONTROL CHASSIS J5 CONNECTIONS

J5-2 PROGRAM RETURN
J5-3 PROGRAM RETURN
J5-8 MONITOR RETURN
J5-9 MONITOR RETURN

These pins are the analog programming and monitoring returns. The PROGRAM RETURNS are connected together as one floating return, and the MONITOR RETURNS are connected together as a separate independent floating return. When instruments are attached to these returns they will "float" to the level of the ground or common potential at the measuring or programming instrument. The differential amplifier circuitry employed automatically adjusts the program and monitor signals to compensate for the difference between COMMON and the ground or common potential at the instrument. This results in a reduction of AC noise and DC offset components between the power supply and the measuring and/or programming instrument.

Caution: Do not allow PROGRAM RETURN or MONITOR RETURN to exceed more than a ± 3 V difference with respect to supply COMMON. RETURNS MUST BE CONNECTED TO A LOW IMPEDANCE SOURCE TO INSURE ACCURATE READINGS.

J5-6 COMMON
J5-18 COMMON

These signal commons are provided as a return for TTL HV ENABLE and if desired, a connection point to reference any of the following signals:

- PROGRAM RETURN
- MONITOR RETURN
- CONTROL STATUS (COM)
- HV STATUS (COM)
- FAULT STATUS (COM)

J5-24 GROUND
J5-25 GROUND

These connections are for instrumentation grounding. These connections can be used to ground the shield of the CUSTOMER INTERFACE cable. These connections should NOT be used as the main

connection to earth ground. Use the main ground terminal, E1 on the driver chassis, for that purpose

J5-5 +10 V REFERENCE
J5-17 +10 V REFERENCE

This output is an ultra-stable, positive 10 V reference that is supplied for user programming applications. Maximum current drain should be limited to 4 mA.

It is suggested that if this output is to be used for programming, that the PROGRAM RETURN be connected to COMMON. This reference is regulated to COMMON not the PROGRAM RETURN and may cause an error in programming level equal to the differential between the commons. An external reference regulated to PROGRAM COMMON may be used if required.

J5-22 TTL ENABLE

For this input to function, the rear panel TTL switch must be in the REMOTE (down) position. When the switch is in the REMOTE position, actuating the HIGH VOLTAGE ON switch (either front panel or external) will not generate HV unless there is a "HIGH" (+2.5 V to +5 V) signal present at this connection. (Since the input is clamped to a zener diode through a 10 k ohm impedance, any voltage from 5 to 15 V is acceptable for enabling this input.) A "LOW" (V = 0 to 2.0 V) or disconnect will turn the high voltage off. (This will also reset CURRENT TRIP if enabled.)

Unlike the front panel push-buttons, the signal applied to the TTL ENABLE input must be a constant, not momentary signal. An example of how the TTL ENABLE signal operates the high voltage follows:

- 1 AC power is applied to the supply with TTL ENABLE "LOW". Supply is now in standby mode.
- 2 The HIGH VOLTAGE ON switch is actuated (either front panel or external). The supply is no longer in standby, but the HV generation is inhibited by the TTL ENABLE signal.
- 3 A "HIGH" signal is sent to the TTL ENABLE input, turning on the high voltage.
- 4 Sometime later, with the supply set for current trip (rear panel CURRENT switch in TRIP position), an overcurrent occurs and the HV latches off. The supply is now in current trip mode as indicated by the illumination of the MILLIAMPERE/AMPERE CONTROL lamp.
- 5 The "HIGH" signal at the TTL ENABLE input is brought "LOW", resetting the current trip circuit as indicated by the MILLIAMPERE/AMPERE CONTROL lamp extinguishing and the KILOVOLT CONTROL lamp illuminating. The HV remains off due to the TTL ENABLE "LOW".
- 6 A high signal is again applied to the TTL ENABLE input and the high voltage output returns.

J5-1 V PROGRAM

This input becomes active when the front panel REMOTE PROGRAMMING kV switch is in the REMOTE position; the front panel KILOVOLT CONTROL is then disabled. A 0 to +10 V signal with respect to PROGRAM RETURN at this input will program the output voltage proportionally from zero

to full output. There are several ways to program this input:

- A user supplied 0 to +10 V signal (such as a D to A converter)
- A user supplied potentiometer (5 to 50 k ohms, 10 k nominal) can be connected between the +10 V REFERENCE and PROGRAM RETURN with the wiper connected to V PROGRAM and the PROGRAM RETURN connected to COMMON.
- The V PROGRAM input may be jumpered to the +10 V REFERENCE and the PROGRAM RETURN connected to COMMON for a fixed output at the maximum voltage. A resistor divider could also be used to program any fixed voltage.

Note: The PROGRAM RETURN should always be terminated by a low impedance source to within ± 3 V of ground at the programming source. Leaving the PROGRAM RETURN "floating" will introduce noise and offsets on the programming signal.

J5-4 I PROGRAM

This input becomes active when the front panel REMOTE PROGRAMMING mA switch is in the REMOTE position; the front panel MILLIAMPERE/AMPERE CONTROL is then disabled. A 0 to +10 V signal with respect to PROGRAM RETURN, at this input will program the output voltage proportionally from zero to full output. There are several ways to program this input:

- A user supplied 0 to +10 V signal (such as a D to A converter)
- A user supplied potentiometer (5 TO 50 k ohms, 10 k nominal) can be connected between the +10 V REFERENCE and PROGRAM RETURN with the wiper connected to I PROGRAM and the PROGRAM RETURN connected to COMMON.
- The I PROGRAM input may be jumpered to the +10 V REFERENCE and the PROGRAM RETURN connected to COMMON for a fixed output at the maximum voltage. A resistor divider could also be used to program any fixed voltage.

Note: The PROGRAM RETURN should always be terminated by a low impedance source to within ± 3 V of ground at the programming source. Leaving the PROGRAM RETURN "floating" will introduce noise and offsets on the programming signal.

J5-7 V MONITOR

This output is a 0 to 10 V signal, positive with respect to MONITOR RETURN, and in direct proportion to the output voltage. A 10 k ohm limiting impedance protects the internal circuitry. Thus, the instrument monitoring this output should have an input impedance greater than 10 megohms; otherwise, the accuracy of the measurement will be degraded. It is also acceptable to use a 1 mA full scale analog meter for monitoring purposes.

Note: The MONITOR RETURN should always be terminated by a low impedance source to within ± 3 V of ground at the monitoring instrument. Leaving the MONITOR RETURN "floating" will introduce noise and offsets on the monitor signal. It is suggested when a high impedance instrument is employed, that a

small bypass capacitor (such as 0.01 μ F) be added at the instrument between the V MONITOR line and MONITOR RETURN, to reduce any high frequency noise that may be picked up on the line.

J5-10 I MONITOR

This output is a 0 to 10 V signal, positive with respect to MONITOR RETURN, and in direct proportion to the output current. A 10 k Ω limiting impedance protects the internal circuitry. Thus, the instrument monitoring this output should have an input impedance greater than 10 megohms, otherwise, the accuracy of the measurement will be degraded. It is also acceptable to use a 1 mA full scale analog meter for monitoring purposes.

Note: The MONITOR RETURN should always be terminated by a low impedance source to within ± 3 V of ground at the monitoring instrument. Leaving the MONITOR RETURN "floating" will introduce noise and offsets on the monitor signal. It is suggested when a high impedance instrument is employed, that a small bypass capacitor (such as 0.01 μ F) be added at the instrument between the V MONITOR line and MONITOR RETURN, to reduce any high frequency noise that may be picked up on the line.

STATUS MONITOR SIGNALS

Three status monitor signals are provided for logic or computer interface. These signals are supplied by means of "Form C" (SPDT) relay contacts. The contact ratings are 24 V @ 1 A max and are isolated from ground by 60 VDC maximum. The three sets of status monitor relay connections are as follows:

- J5-13 V CONTROL STATUS (NC)
- J5-12 I CONTROL STATUS (NO)
- J5-11 CONTROL STATUS (COM)

When the supply goes into current regulation or CURRENT TRIP mode (as determined by the rear panel CURRENT switch), the CONTROL STATUS relay energizes and the CONTROL STATUS (COM) contact transfers from V CONTROL (NC) to I CONTROL (NO).

- J5-14 HV STATUS (NC)
- J5-15 HV STATUS (NO)
- J5-16 HV STATUS (COM)

When the supply begins generating HV, the HV STATUS relay energizes and the HV STATUS (COM) contact transfers from HV STATUS (NC) to HV STATUS (NO).

- J5-19 FAULT STATUS (NC)**
- J5-20 FAULT STATUS (NO)**
- J5-23 FAULT STATUS (COM)**

When an internal fault occurs, the FAULT STATUS relay energizes and the FAULT STATUS (COM) contact transfers from FAULT STATUS (NC) to FAULT STATUS (NO)

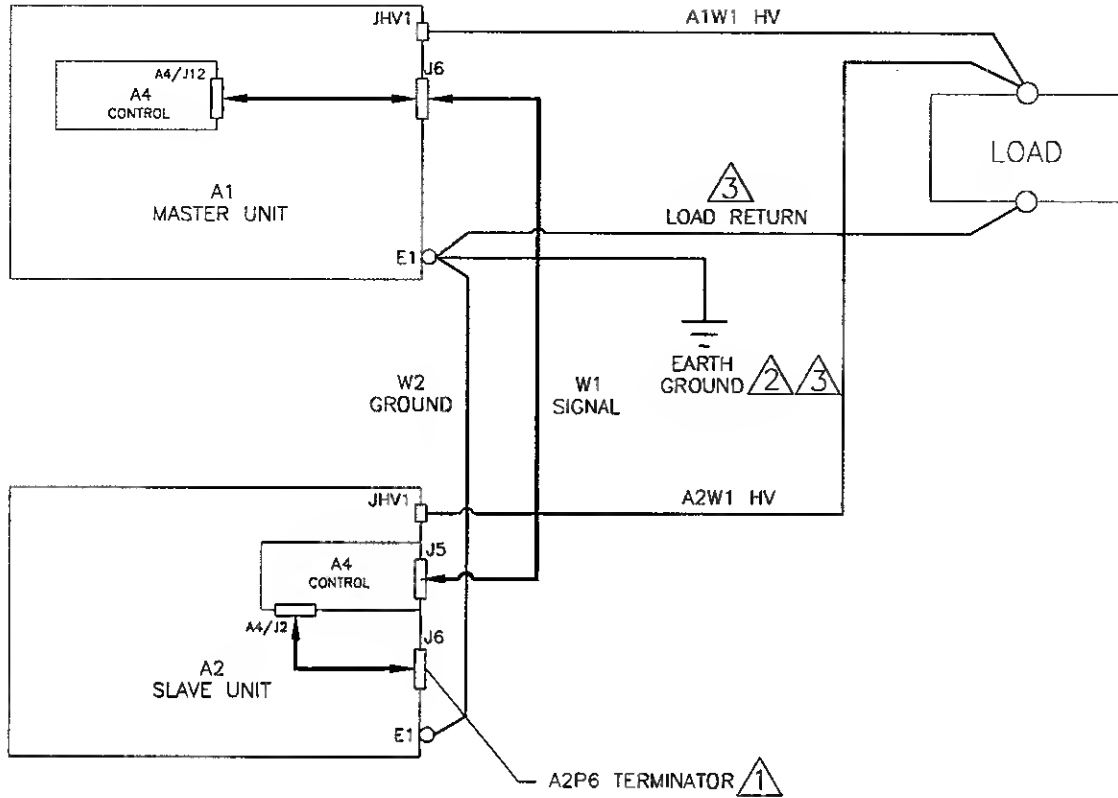
As an illustration of how FAULT STATUS and HV STATUS signals differ, consider the following scenario:

- 1 Initially, there is no AC power applied and all status relays are de-energized
- 2 AC power is applied with a "HIGH" on the TTL ENABLE (with TTL switch set to REMOTE) There is no change to the status relays (assuming there are no faults)
- 3 The HIGH VOLTAGE ON push-button is pressed causing the generation of HV and the HV STATUS relay to energize
- 4 Sometime later, a fan fails inside the unit causing a fault and shutting off the high voltage The FAULT STATUS relay energizes to indicate the presence of a fault and the HV STATUS relay de-energizes indicating the absence of HV at the output
- 5 An attempt is made to restart the HV by depressing the HV on switch and toggling the TTL ENABLE signal, but the fault prevents the HV from being enabled and there is no effect on the HV STATUS relay
- 6 The supply is powered down and the defective fan is replaced
- 7 AC power is applied with a "LOW" TTL ENABLE signal The FAULT STATUS relay is de-energized because there is no longer a fan fault
- 8 The HIGH VOLTAGE ON button is pressed causing the HIGH VOLTAGE ON lamp to illuminate However, the HV STATUS relay does not energize and no HV is generated because the TTL ENABLE is still low
- 9 Upon bringing the TTL ENABLE signal "HIGH", HV is generated and the HV status relay energizes

J5-21 RESERVED

This connection is reserved for special options or future expansion of features

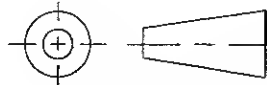

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6365: REF TO NEXT SLAVE REMOVED, FIXED P5 & P6 GENDER	110999	SD
B	TJM	ECN 6454: ADDED NOTES 2 & 3	011900	J-m.

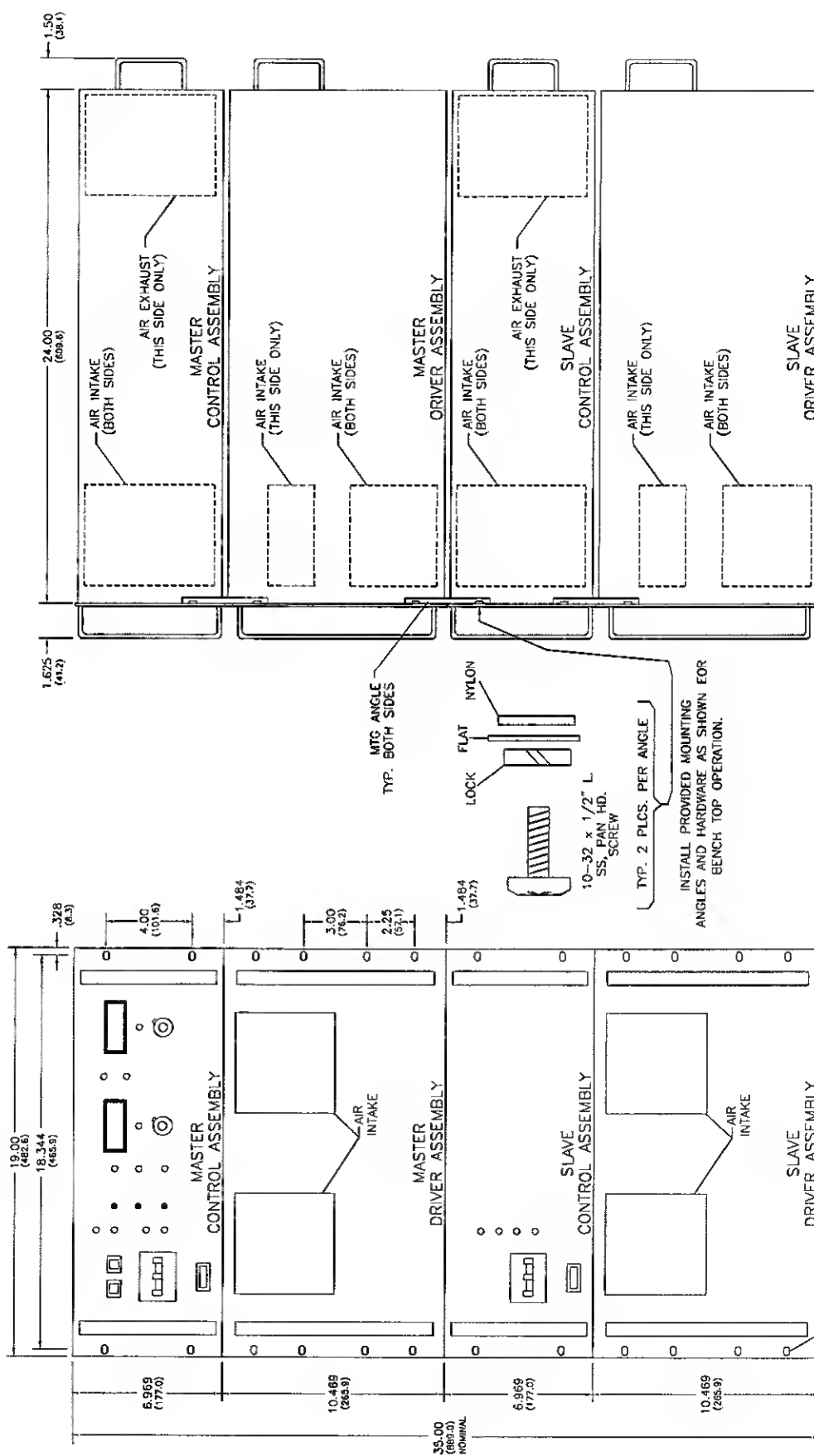


NOTES:



1. TERMINATOR IS A MALE PLUG WITH PINS 2 AND 3 WIRED TOGETHER & PINS 4 AND 5 WIRED TOGETHER, TO BE CONNECTED TO J6 OF SLAVE UNIT
2. **WARNING!!** NEVER OPERATE THIS SYSTEM WITHOUT A GOOD EARTH GROUND CONNECTED AS SHOWN.
3. PROVIDED BY USER

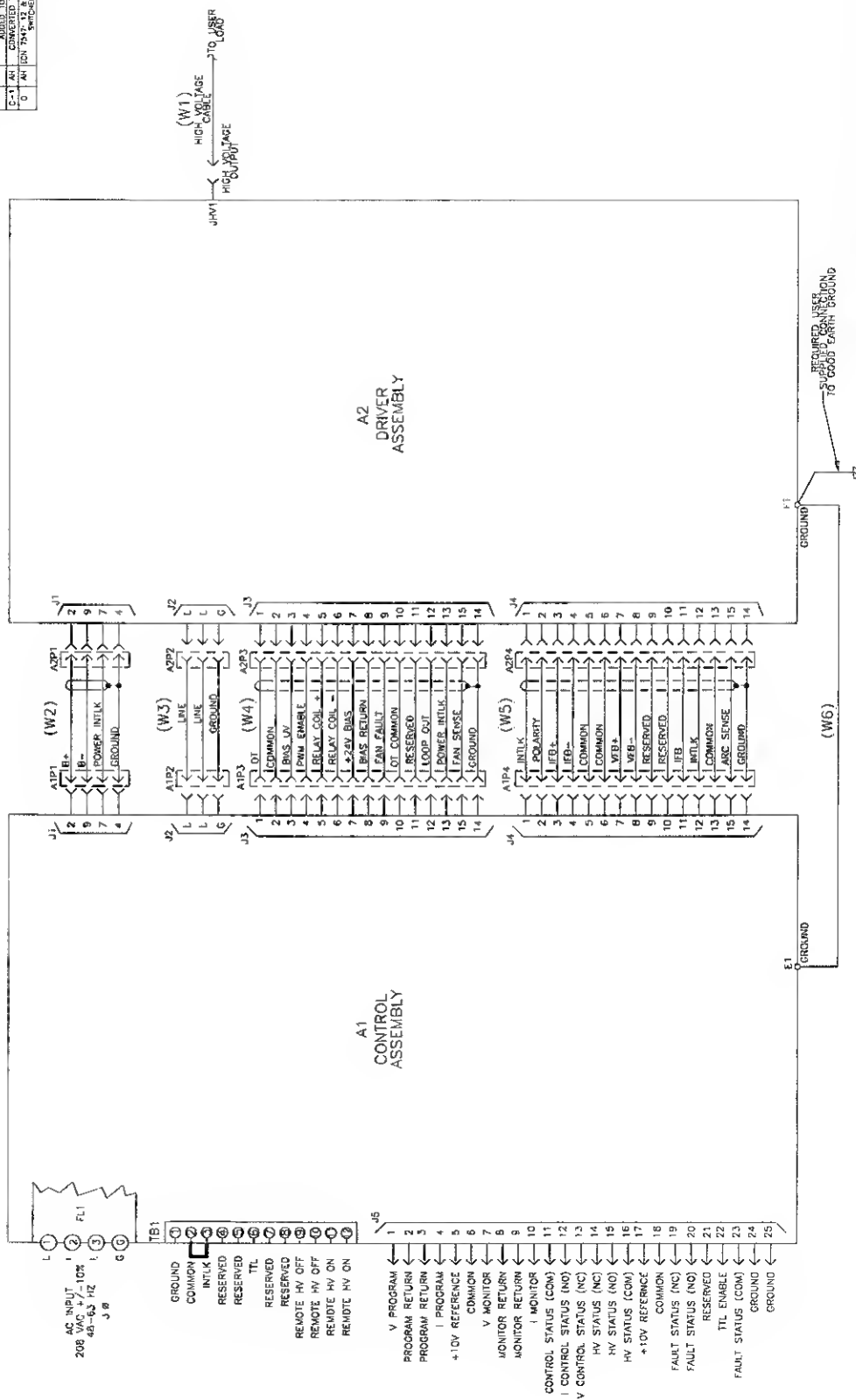
SIGNAL	MOOULE INTERCONNECT CABLE	
	P6 MASTER	P5 SLAVE 1
SLAVE HV ON	1	1
SLAVE FAULT +	2	2
SLAVE FAULT -	3	3
SLAVE TTL	6	6
COMMON	7	7
POLARITY	8	8
RESERVED	9	9
V PROGRAM	11	11
IFB	12	12
I PROGRAM	13	13
SIGNAL COMMON	14	14
SHIELD GROUND	NC	15


UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC .XXX ± XX ± DEG ±  THIRD ANGLE PROJECTION DO NOT SCALE DRAWING	FILE NO. EXTENSION \1000\66001B.OWG		 GLASSMAN HIGH VOLTAGE, INC. P O BOX 551, WHITEHOUSE STATION, N.J 08889 (908) 534-9007 FAX (908) 534-5672	
	APPROVALS DRAWN TJM CHECKED SD RELEASED		DATE 100199 100199	
	TITLE SYSTEM SCHEMATIC SH MASTER/SLAVE		DWG. NO. 100066-001	
	SCALE NONE		SHEET 1 OF 1	



FOR PROPER INSTALLATION, IT IS RECOMMENDED TO MOUNT EQUIPMENT IN A RACK CABINET OR BENCH TOP ENCLOSURE.

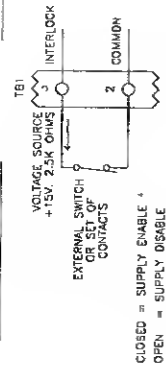
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		 		1/16" ± .001 .001" ± .0005 .005" ± .001 .010" ± .002 .030" ± .005 .060" ± .010 .125" ± .015 .250" ± .020 .500" ± .030 1.000" ± .050 1.500" ± .060 2.000" ± .070 3.000" ± .090 4.000" ± .100 6.000" ± .120 8.000" ± .150 10.000" ± .180 12.000" ± .200 14.000" ± .220 16.000" ± .240 18.000" ± .260 20.000" ± .280 22.000" ± .300 24.000" ± .320 26.000" ± .340 28.000" ± .360 30.000" ± .380 32.000" ± .400 34.000" ± .420 36.000" ± .440 38.000" ± .460 40.000" ± .480 42.000" ± .500 44.000" ± .520 46.000" ± .540 48.000" ± .560 50.000" ± .580 52.000" ± .600 54.000" ± .620 56.000" ± .640 58.000" ± .660 60.000" ± .680 62.000" ± .700 64.000" ± .720 66.000" ± .740 68.000" ± .760 70.000" ± .780 72.000" ± .800 74.000" ± .820 76.000" ± .840 78.000" ± .860 80.000" ± .880 82.000" ± .900 84.000" ± .920 86.000" ± .940 88.000" ± .960 90.000" ± .980 92.000" ± 1.000 94.000" ± 1.020 96.000" ± 1.040 98.000" ± 1.060 100.000" ± 1.080 102.000" ± 1.100 104.000" ± 1.120 106.000" ± 1.140 108.000" ± 1.160 110.000" ± 1.180 112.000" ± 1.200 114.000" ± 1.220 116.000" ± 1.240 118.000" ± 1.260 120.000" ± 1.280 122.000" ± 1.300 124.000" ± 1.320 126.000" ± 1.340 128.000" ± 1.360 130.000" ± 1.380 132.000" ± 1.400 134.000" ± 1.420 136.000" ± 1.440 138.000" ± 1.460 140.000" ± 1.480 142.000" ± 1.500 144.000" ± 1.520 146.000" ± 1.540 148.000" ± 1.560 150.000" ± 1.580 152.000" ± 1.600 154.000" ± 1.620 156.000" ± 1.640 158.000" ± 1.660 160.000" ± 1.680 162.000" ± 1.700 164.000" ± 1.720 166.000" ± 1.740 168.000" ± 1.760 170.000" ± 1.780 172.000" ± 1.800 174.000" ± 1.820 176.000" ± 1.840 178.000" ± 1.860 180.000" ± 1.880 182.000" ± 1.900 184.000" ± 1.920 186.000" ± 1.940 188.000" ± 1.960 190.000" ± 1.980 192.000" ± 2.000 194.000" ± 2.020 196.000" ± 2.040 198.000" ± 2.060 200.000" ± 2.080 202.000" ± 2.100 204.000" ± 2.120 206.000" ± 2.140 208.000" ± 2.160 210.000" ± 2.180 212.000" ± 2.200 214.000" ± 2.220 216.000" ± 2.240 218.000" ± 2.260 220.000" ± 2.280 222.000" ± 2.300 224.000" ± 2.320 226.000" ± 2.340 228.000" ± 2.360 230.000" ± 2.380 232.000" ± 2.400 234.000" ± 2.420 236.000" ± 2.440 238.000" ± 2.460 240.000" ± 2.480 242.000" ± 2.500 244.000" ± 2.520 246.000" ± 2.540 248.000" ± 2.560 250.000" ± 2.580 252.000" ± 2.600 254.000" ± 2.620 256.000" ± 2.640 258.000" ± 2.660 260.000" ± 2.680 262.000" ± 2.700 264.000" ± 2.720 266.000" ± 2.740 268.000" ± 2.760 270.000" ± 2.780 272.000" ± 2.800 274.000" ± 2.820 276.000" ± 2.840 278.000" ± 2.860 280.000" ± 2.880 282.000" ± 2.900 284.000" ± 2.920 286.000" ± 2.940 288.000" ± 2.960 290.000" ± 2.980 292.000" ± 3.000 294.000" ± 3.020 296.000" ± 3.040 298.000" ± 3.060 300.000" ± 3.080 302.000" ± 3.100 304.000" ± 3.120 306.000" ± 3.140 308.000" ± 3.160 310.000" ± 3.180 312.000" ± 3.200 314.000" ± 3.220 316.000" ± 3.240 318.000" ± 3.260 320.000" ± 3.280 322.000" ± 3.300 324.000" ± 3.320 326.000" ± 3.340 328.000" ± 3.360 330.000" ± 3.380 332.000" ± 3.400 334.000" ± 3.420 336.000" ± 3.440 338.000" ± 3.460 340.000" ± 3.480 342.000" ± 3.500 344.000" ± 3.520 346.000" ± 3.540 348.000" ± 3.560 350.000" ± 3.580 352.000" ± 3.600 354.000" ± 3.620 356.000" ± 3.640 358.000" ± 3.660 360.000" ± 3.680 362.000" ± 3.700 364.000" ± 3.720 366.000" ± 3.740 368.000" ± 3.760 370.000" ± 3.780 372.000" ± 3.800 374.000" ± 3.820 376.000" ± 3.840 378.000" ± 3.860 380.000" ± 3.880 382.000" ± 3.900 384.000" ± 3.920 386.000" ± 3.940 388.000" ± 3.960 390.000" ± 3.980 392.000" ± 4.000 394.000" ± 4.020 3	
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UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES	FILE NO.	EXTENSION	 KETCHIKAN HIGH VOLTAGE, INC. P.O. BOX 1000 KETCHIKAN, ALASKA 99901-1000 (907) 638-3860 FAX (907) 638-3700	
DES. NO. KK	DATE	03/19/99	SYNOPSIS	
DWG. NO. KK-2	APPROVALS		STANDARD DIAGRAM	
DRAWN JK	DATE	03/19/99	P&H-50 SERIES	
USED WITH:	CHECKED SO	0324/99	DWG. NO.	200169-001
	RELEASED		SCALE	NINE
			SHEET	OF
DO NOT SCALE DRAWING				

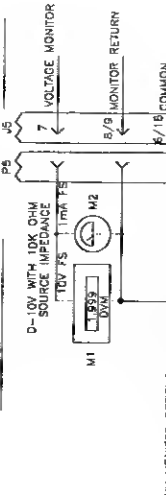
REMOTE INTERLOCK

FIGURE 1



VOLTAGE MONITOR

FIGURE 5

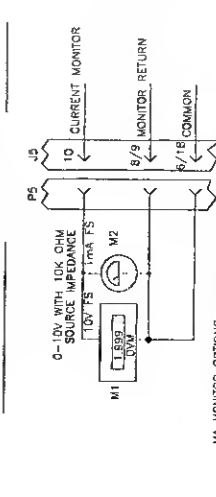


KV MONITOR OPTIONS:

- M1 - RECOMMENDED TYPE METER:
0 - 10V DIRECTLY PROPORTIONAL TO 0 - MAX KV RATING
- M2 - ALTERNATE TYPE METER:
0 - 1mA DIRECTLY PROPORTIONAL TO 0 - MAX KV RATING

CURRENT MONITOR

FIGURE 6



MA MONITOR OPTIONS:

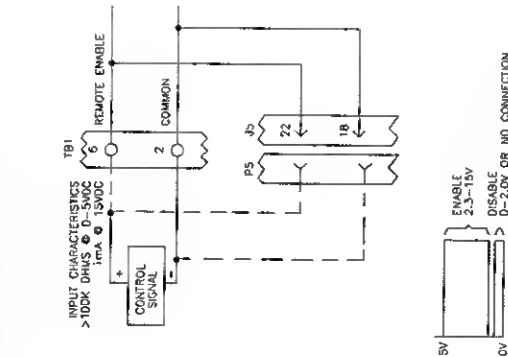
- M1 - RECOMMENDED TYPE METER:
0 - 10V DIRECTLY PROPORTIONAL TO 0 - MAX mA RATING
- M2 - ALTERNATE TYPE METER:
0 - 1mA DIRECTLY PROPORTIONAL TO 0 - MAX mA RATING

MONITOR SIGNALS ARE DIFFERENTIAL WITH MONITOR RETURN ISOLATED FROM COMMON. IT IS RECOMMENDED THAT THEY BE CONNECTED TO COMMON AT THEIR LOAD. MAXIMUM COMMON MODE IS 3VDC.

REMOTE HV ENABLE

FIGURE 2

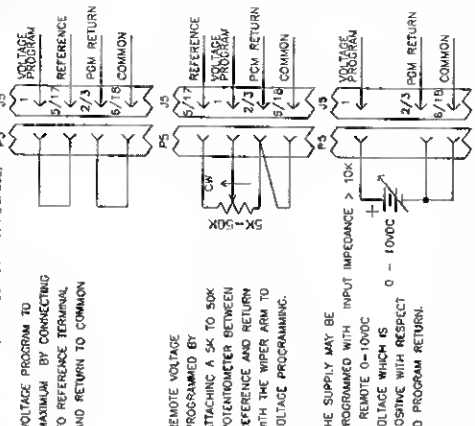
(REAR PANEL SWITCH S3 SET TO REMOTE PROGRAMMING ENABLE POSITION IF APPLICABLE)



REMOTE VOLTAGE PROGRAM

FIGURE 3

(FRONT PANEL SWITCH SET TO REMOTE PROGRAMMING 3A POSITION IF APPLICABLE)

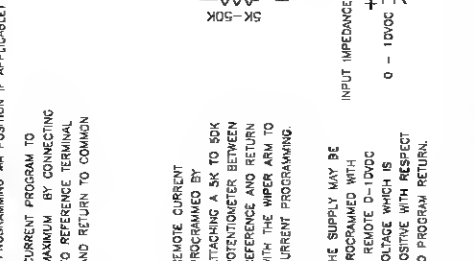


VOLTAGE AND CURRENT PROGRAM SIGNALS ARE DIFFERENTIAL WITH PROGRAM RETURN ISOLATED FROM COMMON. IT IS RECOMMENDED THAT PROGRAM RETURN BE CONNECTED TO COMMON AT THE PROGRAM SOURCE. MAXIMUM COMMON MODE IS 3VDC.

REMOTE CURRENT PROGRAM

FIGURE 4

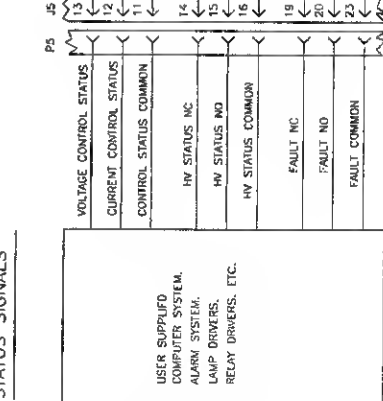
(FRONT PANEL SWITCH SET TO REMOTE PROGRAMMING 3A POSITION IF APPLICABLE)



VOLTAGE AND CURRENT PROGRAM SIGNALS ARE DIFFERENTIAL WITH PROGRAM RETURN ISOLATED FROM COMMON. IT IS RECOMMENDED THAT PROGRAM RETURN BE CONNECTED TO COMMON AT THE PROGRAM SOURCE. MAXIMUM COMMON MODE IS 3VDC.

STATUS SIGNALS

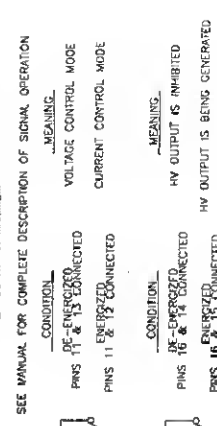
FIGURE 7



EXTERNAL HV ON/OFF

FIGURE 8

(FRONT PANEL SWITCH SET TO REMOTE HV ON/OFF POSITION)

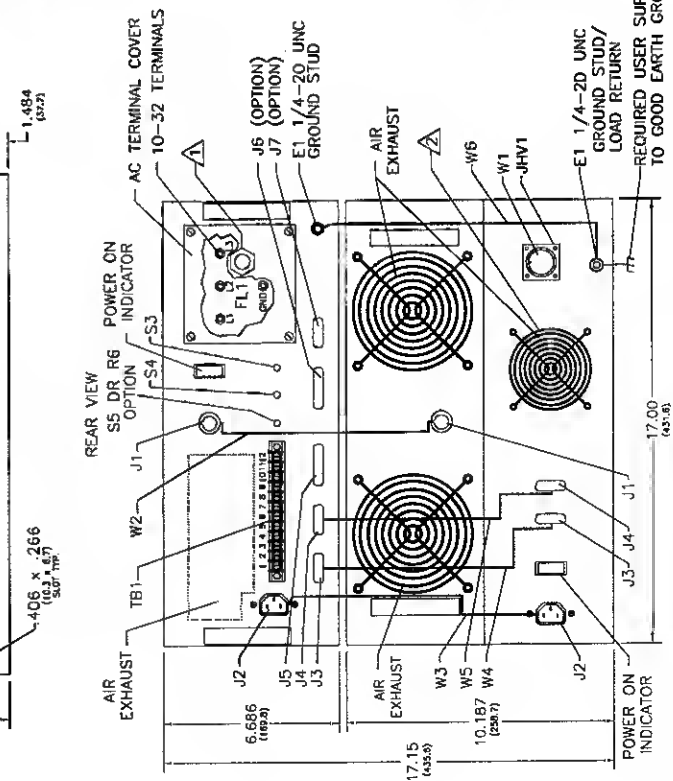
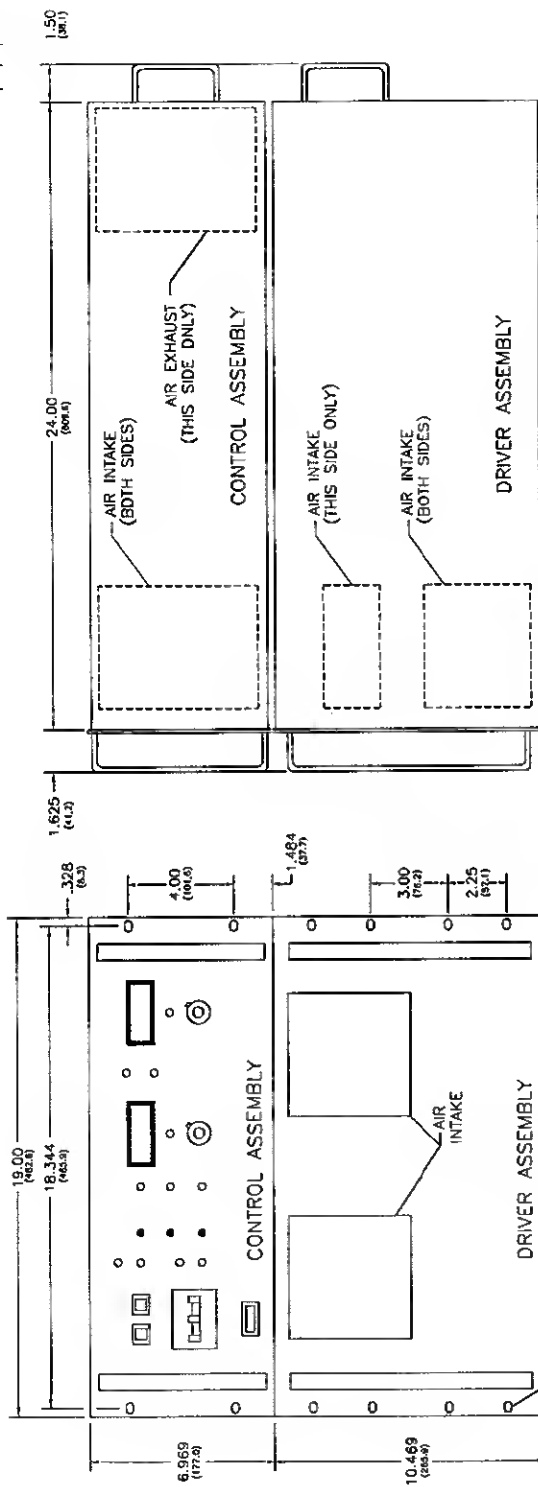


VOLTAGE AND CURRENT PROGRAM SIGNALS ARE DIFFERENTIAL WITH PROGRAM RETURN ISOLATED FROM COMMON. IT IS RECOMMENDED THAT PROGRAM RETURN BE CONNECTED TO COMMON AT THE PROGRAM SOURCE. MAXIMUM COMMON MODE IS 3VDC.

- NOTES:
- THESE DIAGRAMS ARE PROVIDED AS A SUPPLEMENT TO THE INSTRUCTION MANUAL TEXT, NOT AS A SUBSTITUTE. READ INSTRUCTION MANUAL TEXT CAREFULLY BEFORE MAKING CONNECTIONS.
 - TERMINAL NUMBERS SEPARATED BY A "7", SUCH AS 9/22, MEANS EITHER TERMINAL MAY BE USED FOR THE CONNECTION.

REV	BY	DESCRIPTION	DATE	APPROVED
1	JL	INITIAL DESIGN	03/02/00	JL
2	JL	DESIGN CHANGED TO ADD 10K OHM SOURCE IMPEDANCE	03/02/00	JL
3	JL	DESIGN CHANGED TO ADD 10K OHM SOURCE IMPEDANCE	03/02/00	JL
4	JL	DESIGN CHANGED TO ADD 10K OHM SOURCE IMPEDANCE	03/02/00	JL

FILE NO	EXTENSION	GLASSMAN HIGH VOLTAGE, INC.
APPROVALS	DATE	FILE
DESIGN	08/17/99	08/17/99
CHECKED BY	08/17/99	08/17/99
RELEASED	08/17/99	08/17/99
DWG NO	200169-001	REV. A
SCALE	NONE	SHEET 1 OF 1



- | CONTROL ASSEMBLY | | TS1 | | |
|------------------|---------------------------|-----|--------------------|--------------------|
| 15 | 1 - V PROGRAM | 14 | HV STATUS (NC) | 1 - GROUND |
| 2 | 2 - PROGRAM RETURN | 15 | HV STATUS (NO) | 2 - COMMON |
| 3 | 3 - PROGRAM RETURN | 16 | HV STATUS (COM) | 3 - INTERLOCK |
| 4 | 4 - PROGRAM | 17 | +1DV REFERENCE | 4 - RESERVED |
| 5 | 5 - +10V REFERENCE | 18 | COMMON | 5 - RESERVED |
| 6 | 6 - COMMON | 19 | FAULT STATUS (NC) | 6 - TTL ENABLE |
| 7 | 7 - V MONITOR | 20 | FAULT STATUS (NO) | 7 - RESERVED |
| 8 | 8 - MONITOR RETURN | 21 | RESERVED | 8 - RESERVED |
| 9 | 9 - MONITOR RETURN | 22 | TTL ENABLE | 9 - REMOTE HV OFF |
| 10 | 10 - MONITOR | 23 | FAULT STATUS (COM) | 10 - REMOTE HV OFF |
| 11 | 11 - CONTROL STATUS (COM) | 24 | GROUND | 11 - REMOTE HV ON |
| 12 | 12 - CONTROL STATUS (NO) | 25 | GROUND | 12 - REMOTE HV ON |

- J1 — DC POWER INTERFACE
J2 — AC POWER INTERFACE
J3 — INVERTER INTERFACE
J4 — HIGH VOLTAGE INTERFACE
E1 — GROUND STUD
- FL1 — AC INPUT — 208 VAC
+ 10%
48-63 HZ
3 PHASE
- S3 — TTL LOCAL/REMOTE
S4 — CURRENT LIMIT/TRIP
- △ — STRAIN RELIEF FOR 70" — 98" DIA. CORD OR INSULATED WIRE BUNDLE. (SUPPLIED)
PROPER INSULATION/STRAIN RELIEF MUST BE MAINTAINED
THROUGH AC TERMINAL COVER FOR SAFE OPERATION!
- △ — FAN GUARD PROVIDED ON >6KV UNITS, AIR HOLES ON ≤6KV UNITS.

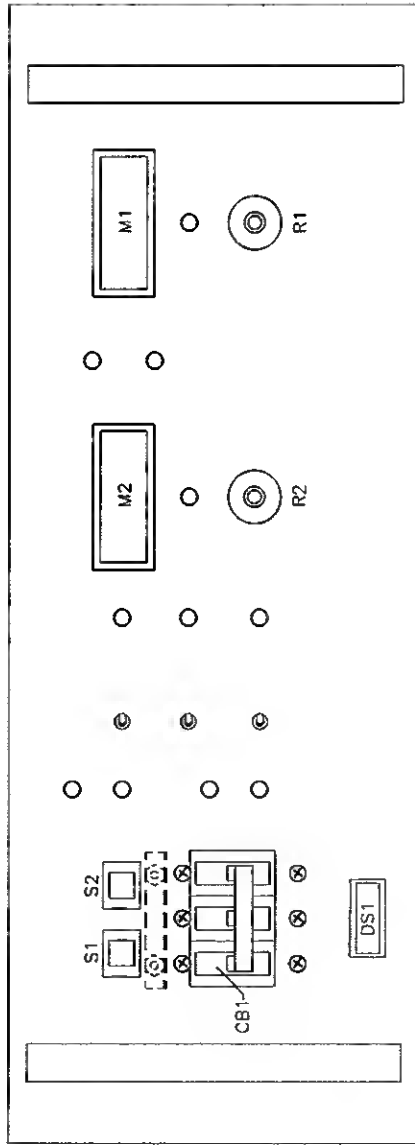
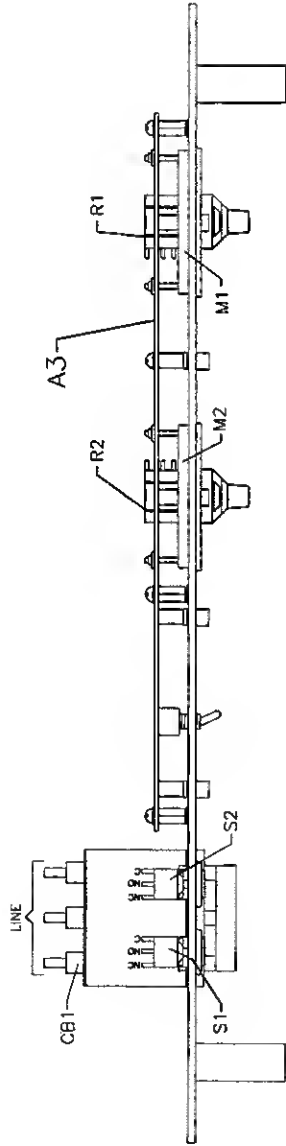
- | DRIVER ASSEMBLY | |
|-----------------|-------------------------------------|
| J1 | DC POWER INTERFACE |
| J2 | AC POWER INTERFACE |
| J4 | HIGH VOLTAGE OUTPUT CONNECTOR |
| | 1-60KV AMPHENOL 83-1R OR EQUIVALENT |
| | 70-100KV MS3102A-18 (SHOWN) |
| E1 | LOAD RETURN GROUNDO STUD |

- | | J1 - DC POWER INTERFACE | J3 - INVERTER INTERFACE | IN |
|--|-------------------------|-----------------------------|------|
| | J2 - AC POWER INTERFACE | J4 - HIGH VOLTAGE INTERFACE | (MM) |

- | | | | |
|--|-----------|----------|-----|
| FILE NO. | EXTENSION | DATE | BY |
| 100-104017-2 | | 10/17/78 | ENC |
| MAKE SURE OUTLINE IS
IDENTICAL TO THE
ONE ON THE DRAWING | | | |
| NO. | REV. | DATE | BY |
| 1 | 1 | 10/17/78 | ENC |
| CHECKED BY: <u>ENC</u>
DRAWN BY: <u>ENC</u>
DATE: <u>10/17/78</u> | | | |
| TITLE: <u>OUTLINE & INSTALLATION</u>
SHEET: <u>1</u> OF <u>3</u> | | | |
| PROJECT: <u>CLASSMAN HIGH VOLTAGE, INC.</u>
ADDRESS: <u>100-104017-2</u>
CITY: <u>NEW YORK, NY 10001</u>
STATE: <u>NY</u> | | | |
| SCALE: <u>1" = 1' 0"</u> | | | |
| SHEET: <u>1</u> OF <u>3</u> | | | |
| PROJECT: <u>CLASSMAN HIGH VOLTAGE, INC.</u>
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CITY: <u>NEW YORK, NY 10001</u>
STATE: <u>NY</u> | | | |
| SCALE: <u></u> | | | |

ED CONNECTION
D **NET WEIGHT: 110 lbs. 41 kg.**

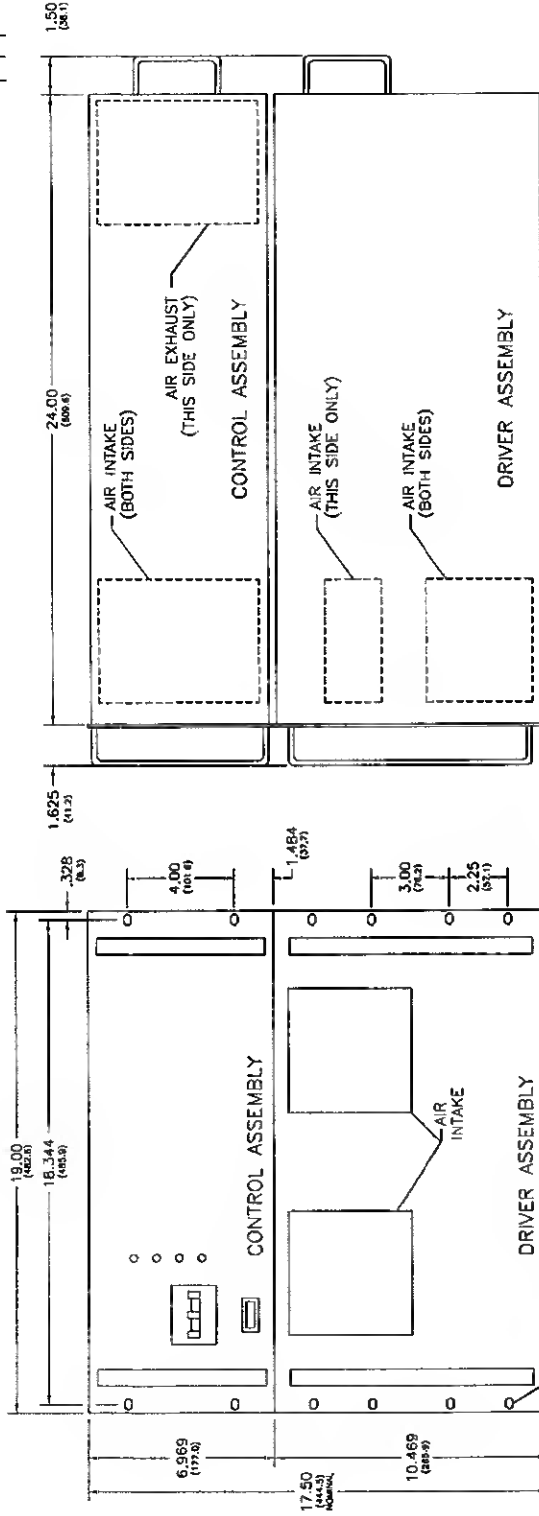
REV	BY	DESCRIPTION	DATE	APPROVED
REV-1	JMC	ADDED INTS 1 & 2 TO PINS	04/08/88	JMC
REV-2	JMC	UPDATING SYMBOLS	04/08/88	JMC



NOTES:

- 1 -- ALL ITEMS SHOWN ARE PREFIXED BY "1"
EXAMPLE: 1M1.

PARTS LISTING SHEET DRAWING NO. 201408-002 TITLE PARTS PLACEMENT APP-5H DIGITAL DATE 03/28/88 DESIGNED BY JMC CHECKED BY JMC RELEASED SCALE NONE SHEET 1 OF 1		GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, NEW BRIDGE, N.J. 08053 (609) 328-1111 FAX (609) 328-1111
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CONTROL ASSEMBLY

- J1 - DC POWER INTERFACE
- J2 - AC POWER INTERFACE
- J3 - INVERTER INTERFACE
- J4 - HIGH VOLTAGE OUTPUT CONNECTOR
- J5 - SLAVE INTERFACE INPUT
- J6 - SLAVE INTERFACE OUTPUT
- E1 - GROUND STUD

FL1 - AC INPUT - 208 VAC
+/- 10%
48-63 HZ
3 PHASE

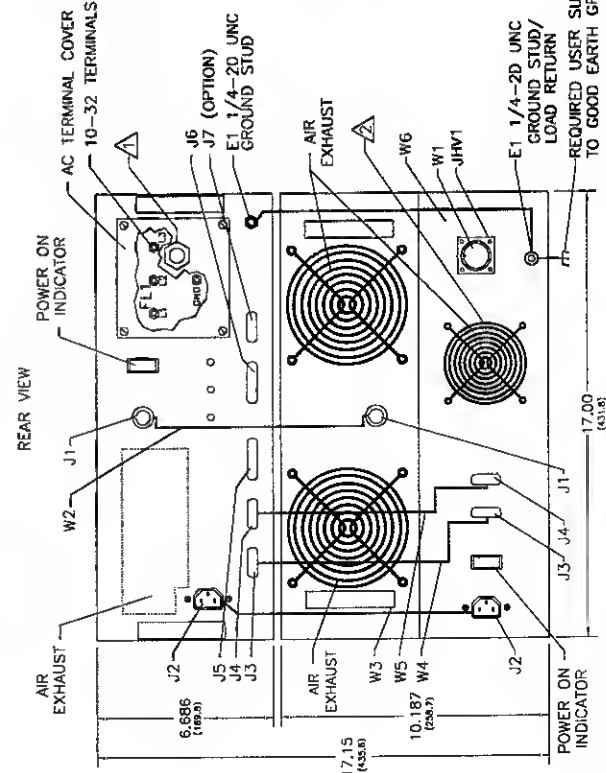
△ - STRAIN RELIEF FOR .70" - .98" DIA. CORD OR INSULATED WIRE BUNDLE. (SUPPLIED)
PROPER INSULATION/STRAIN RELIEF MUST BE MAINTAINED
THROUGH AC TERMINAL COVER FOR SAFE OPERATION!

△ - FAN GUARD PROVIDED ON >6KV UNITS, AIR HOLES ON i-6KV UNITS.

DRIVER ASSEMBLY

- J1 - DC POWER INTERFACE
- J2 - AC POWER INTERFACE
- E1 - LOAD RETURN GROUND STUD
- J3 - INVERTER INTERFACE
- J4 - HIGH VOLTAGE OUTPUT CONNECTOR
- JHV1 - 1-60KV AMPHENOL 83-18 OR EQUIVALENT
70-100KV MS102A-18 (SHOWN)

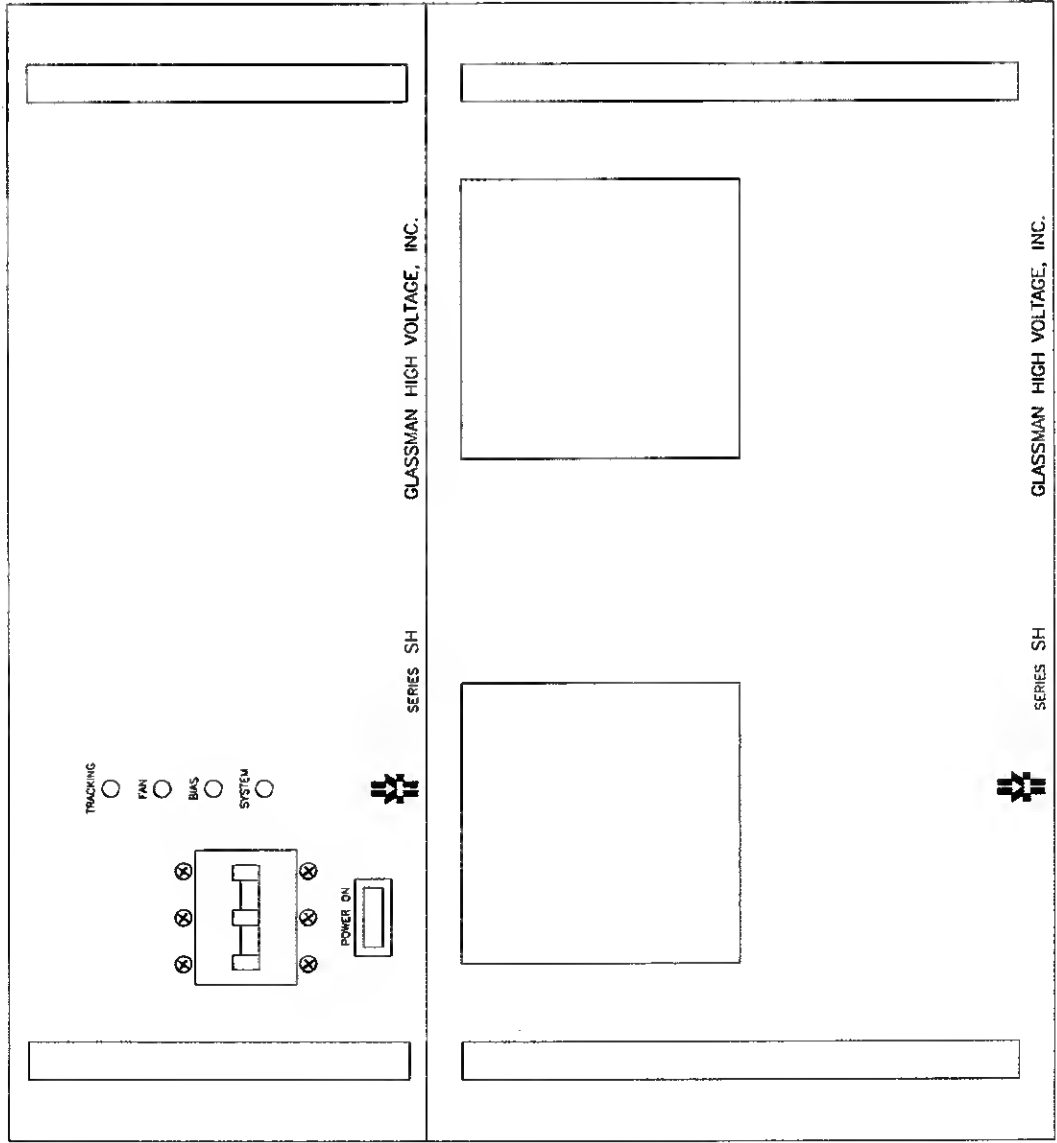
NET WEIGHT: 110 lbs. 41 kg. (MM)



FILE NO.	DESCRIPTION	DATE	BY	CHKD	APP'D	REV	SCALE	INCHES	MILLIMETERS
1	OUTLINE & INSTALLATION								
2	SH-1000								
3	SH-1000								
4	SH-1000								
5	SH-1000								
6	SH-1000								
7	SH-1000								
8	SH-1000								
9	SH-1000								
10	SH-1000								
11	SH-1000								
12	SH-1000								
13	SH-1000								
14	SH-1000								
15	SH-1000								
16	SH-1000								
17	SH-1000								
18	SH-1000								
19	SH-1000								
20	SH-1000								

REQUIRED USER SUPPLIED CONNECTION
TO GOOD EARTH GROUND

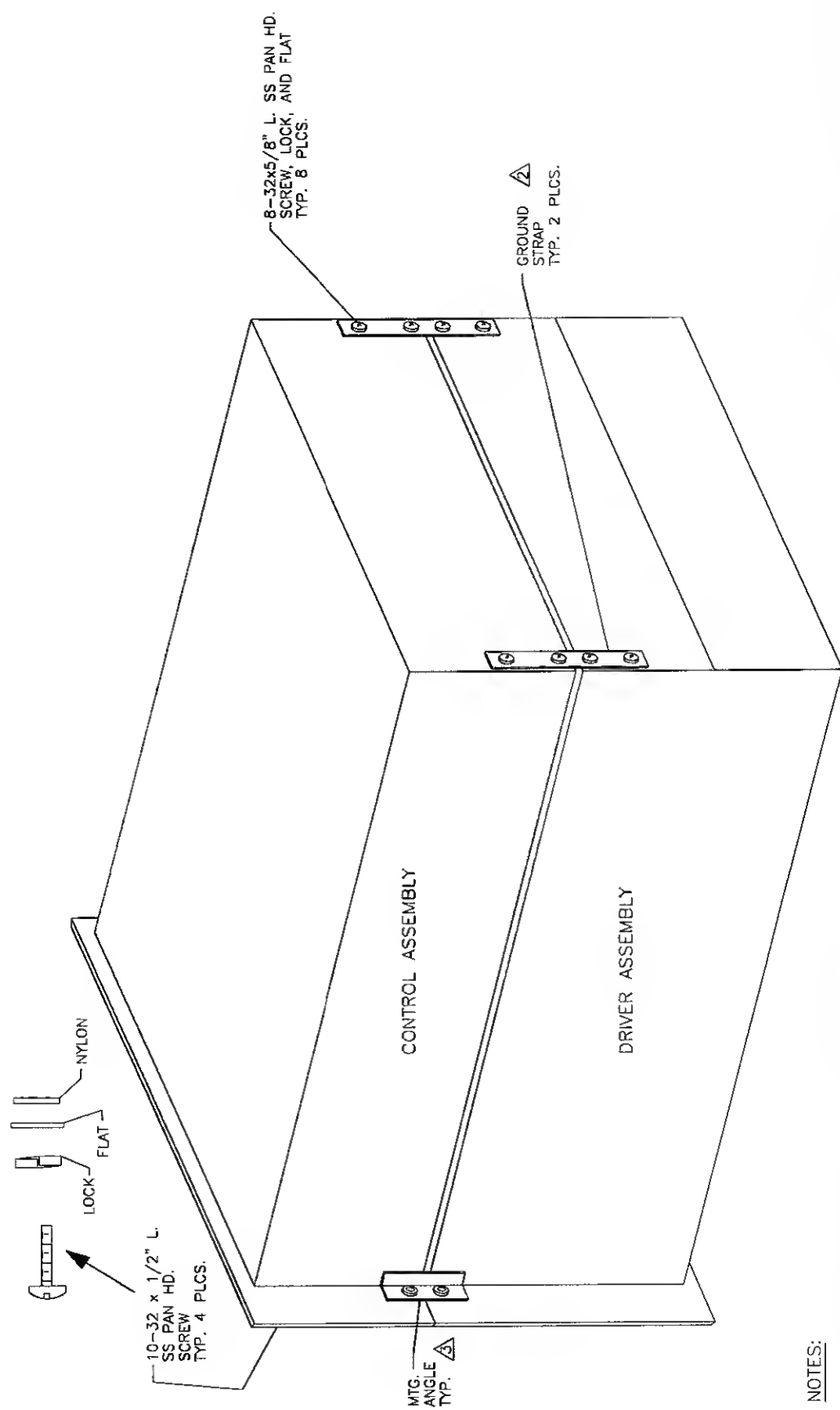
REV	BY	DESCRIPTION	DATE	APPROVED



FILE NO. 001004 DATE 08/20/04 APPROVALS TYPED NAME PRODUCTION DO NOT SCALE DRAWING		GLASSMAN HIGH VOLTAGE, INC. 1000 63-3000 FOR 63-3000 OUTLINE & INSTALLATION SH SERIES SLAVE 201404-018 NR	
SCALE NONE SHEET 2 OF 3		D	

IN
(MM)

REV	BY	DESCRIPTION	DATE	APPROVED

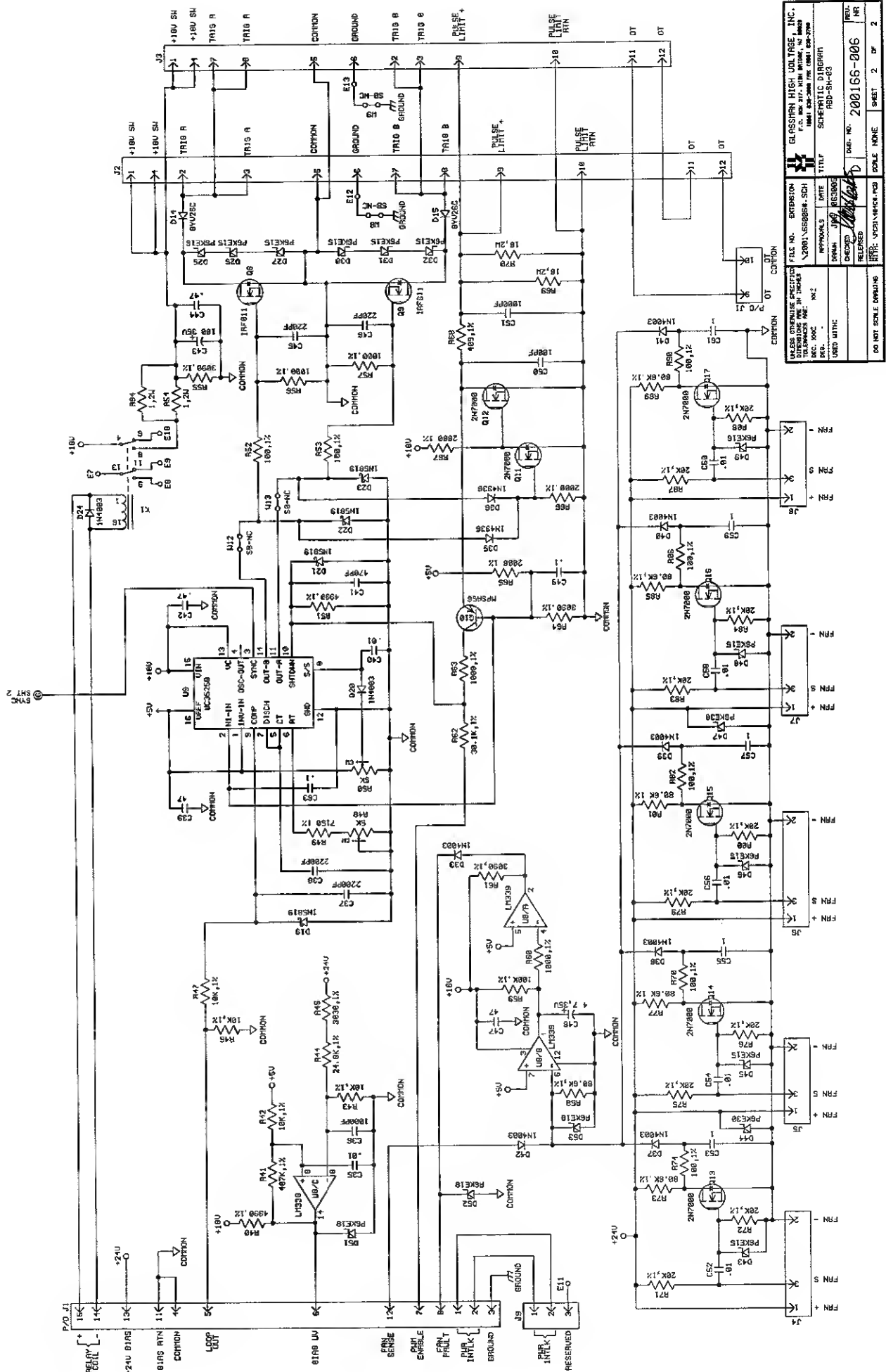


NOTES:

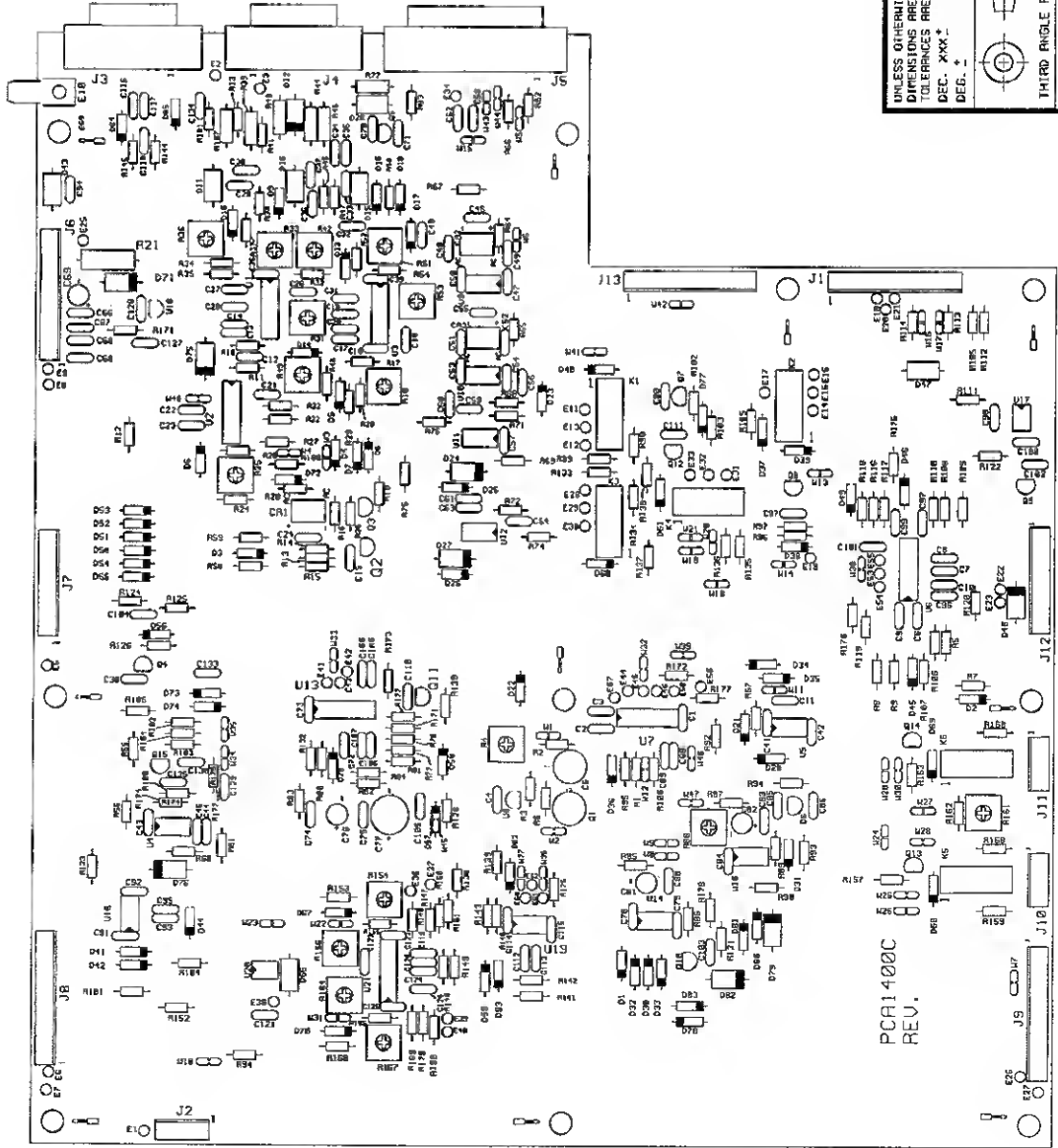
- 1 - FOR PROPER INSTALLATION IT IS RECOMMENDED TO MOUNT EQUIPMENT IN A RACK CABINET OR BENCH TOP ENCLOSURE.
- 2 - ATTACH GROUND STRAPS AS SHOWN AND SECURE WITH HARDWARE PROVIDED.
- 3 - FOR BENCH TOP OPERATION WITHOUT AN ENCLOSURE, ATTACH MOUNTING ANGLES AS SHOWN.

GLASSMAN HIGH VOLTAGE, INC. 1000 W. 10TH AVE. SUITE 100 DENVER, CO 80202	
FILE NO. 1201A-04018-DWG APPROVALS DESIGNED BY CHECKED BY DATE	TITLE OUTLINE & INSTALLATION SH SERIES SLAVE Dwg No. 201404-018 SCALE NONE SHEET 3 OF 3

IN
(MM)



REV	BY	DESCRIPTION	DATE	APPROVED



REDUCED ONLY

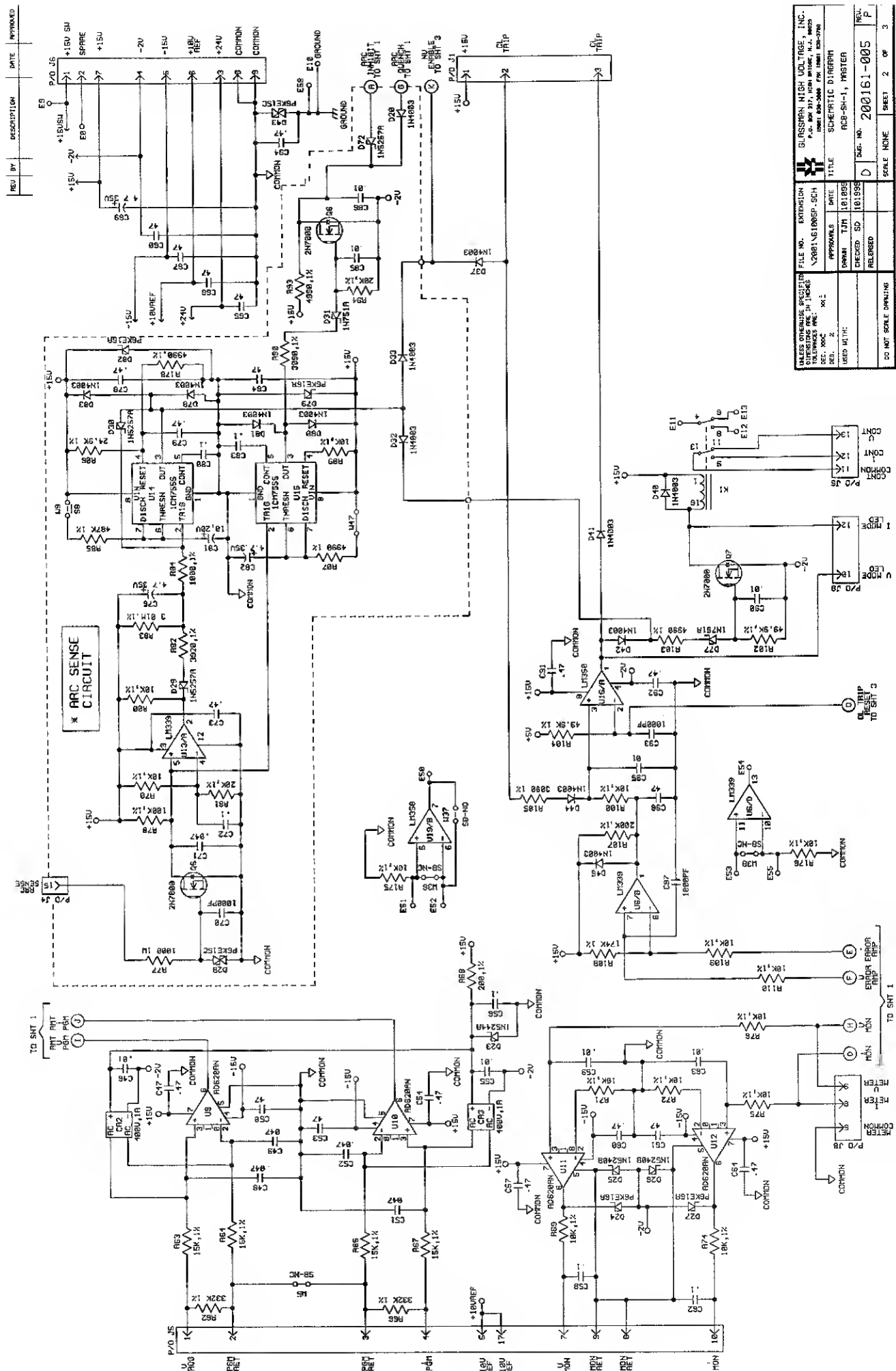
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC. .XXX MFG. .XX	THIRD ANGLE PROJECTION	DO NOT SCALE DRAWING
--	------------------------	----------------------

FILE NO.	EXTENSION
PCA140000SH-PCB	
APPROVALS	DATE
DRAWN TJM	07/08/03
CHECKED <i>fw</i>	07/06/03
RELEASED	
SSP	

TITLE	PARTS PLACEMENT
DWG. NO.	PCB-SH-i (PCA1400C)
REV.	NR
SCALE	NONE
SHEET	1 OF 1

GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BRIDGE, N.J. 08829 (908) 638-3800 FAX (908) 638-3788

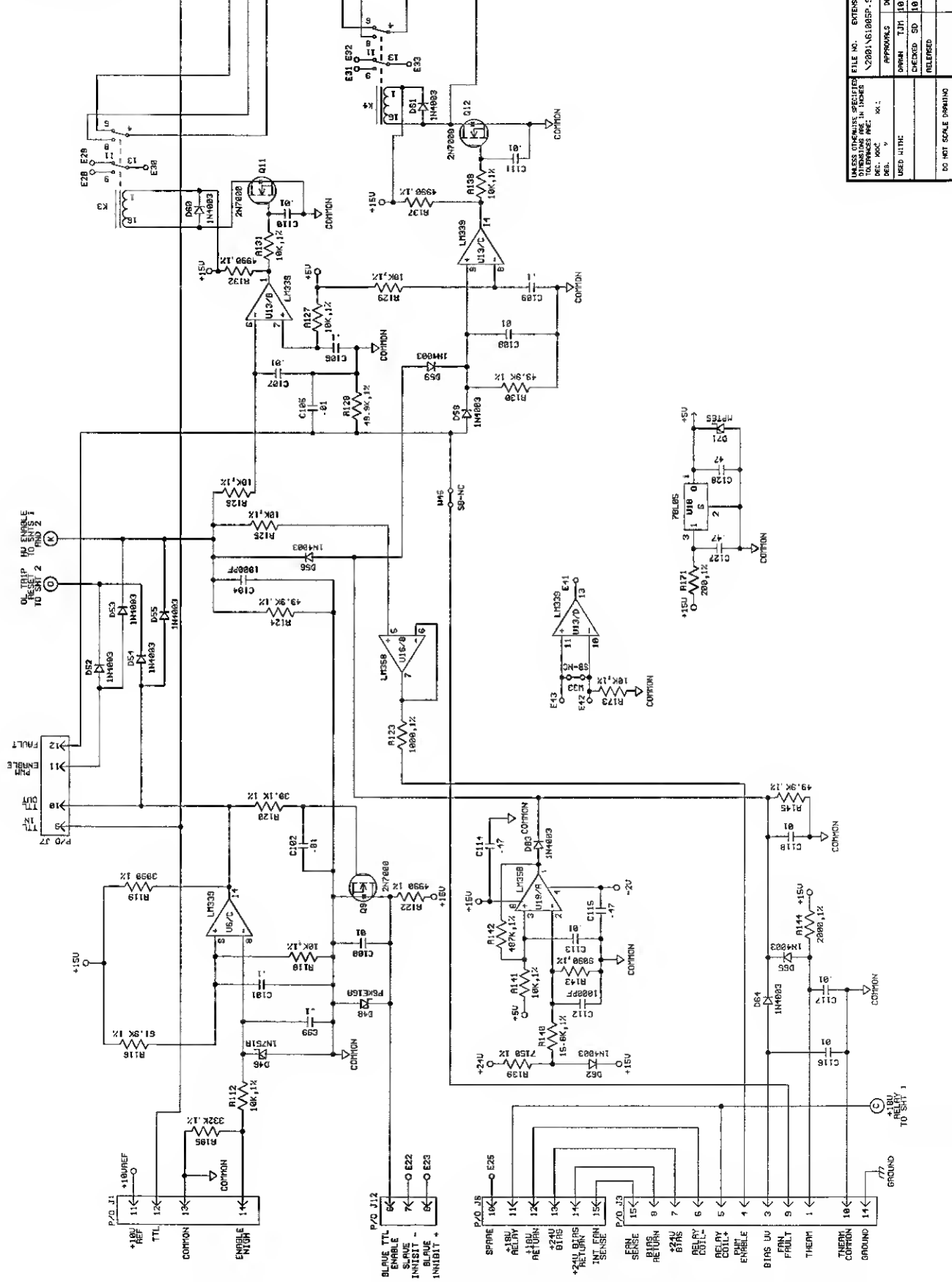
PCA1400C REV.



FILE NO.	EXTENSION	DATE	TITLE	SCALE	SHEET	OF
200161-005	SCH	10/19/95	SCHEMATIC DIAGRAM		2	3
DESIGNED BY	W. J. M.	DATE	10/19/95	APPROVED BY	W. J. M.	
USED M.T.C.		CHECKED BY	SD 10/19/95	RELEASED		
DO NOT SCALE DIMENSIONS						

GLASSBORO HIGH VOLTAGE, INC.	200161-005	DATE	TITLE	SCALE	SHEET	OF
DESIGNED BY	W. J. M.	DATE	10/19/95	APPROVED BY	W. J. M.	
USED M.T.C.		CHECKED BY	SD 10/19/95	RELEASED		
DO NOT SCALE DIMENSIONS						

REV. BY	DESCRIPTION	DATE	APPROVED
J	ECN 7047, 12 & 13	01/02	AN
K	ECN 7785, 0002 Q2	01/02	DAS
L	ECN 7785, 0002 Q2	11/02	JTT
M	ECN 7785, 0002 Q2	11/02	JTT
N	ECN 7785, 0002 Q2	11/02	JTT
P	ECN 7785, 0002 Q2	11/02	JTT
Q	ECN 7785, 0002 Q2	11/02	JTT
R	ECN 7785, 0002 Q2	11/02	JTT
S	ECN 7785, 0002 Q2	11/02	JTT
T	ECN 7785, 0002 Q2	11/02	JTT
U	ECN 7785, 0002 Q2	11/02	JTT
V	ECN 7785, 0002 Q2	11/02	JTT
W	ECN 7785, 0002 Q2	11/02	JTT
X	ECN 7785, 0002 Q2	11/02	JTT
Y	ECN 7785, 0002 Q2	11/02	JTT
Z	ECN 7785, 0002 Q2	11/02	JTT

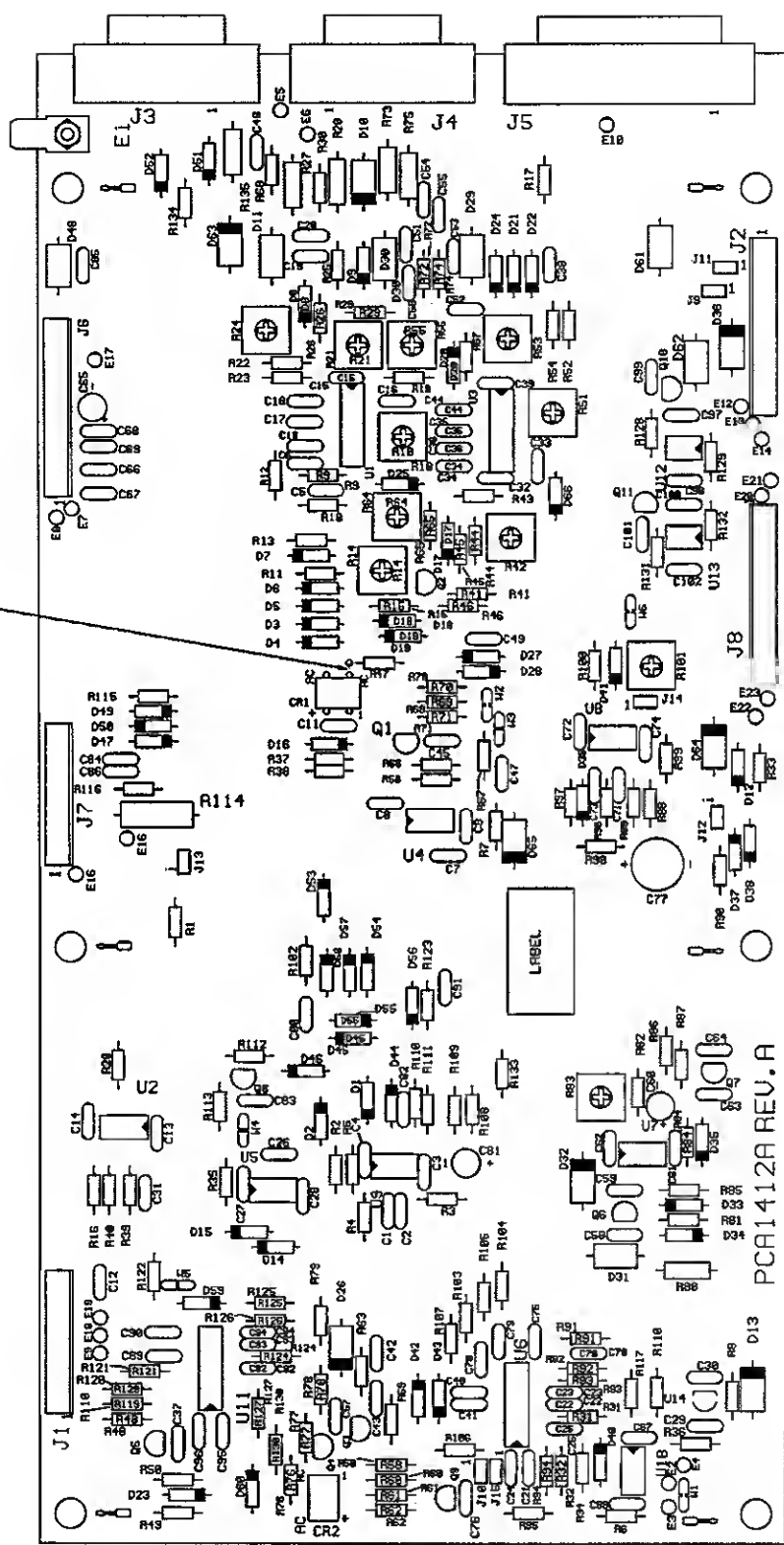


FILE NO.	EXTENSION	TITLE	DATE	APPROVALS	DESIGNER	CHECKED	DATE	SCALE	SHEET	OF	3
UNLESS OTHERWISE SPECIFIED	2200161-005	SCHEMATIC DIAGRAM	01/02	AN	JTT	01/02	01/02	DO NOT SCALE DRAWING	3	OF	3
DESIGNER	JTT	01/02	01/02	AN	JTT	01/02	01/02	DO NOT SCALE DRAWING	3	OF	3
CHECKED	SD	01/02	01/02	AN	JTT	01/02	01/02	DO NOT SCALE DRAWING	3	OF	3
RELEASED				AN	JTT	01/02	01/02	DO NOT SCALE DRAWING	3	OF	3

FILE NO.	EXTENSION	TITLE	DATE	APPROVALS	DESIGNER	CHECKED	DATE	SCALE	SHEET	OF	3
UNLESS OTHERWISE SPECIFIED	2200161-005	SCHEMATIC DIAGRAM	01/02	AN	JTT	01/02	01/02	DO NOT SCALE DRAWING	3	OF	3
DESIGNER	JTT	01/02	01/02	AN	JTT	01/02	01/02	DO NOT SCALE DRAWING	3	OF	3
CHECKED	SD	01/02	01/02	AN	JTT	01/02	01/02	DO NOT SCALE DRAWING	3	OF	3
RELEASED				AN	JTT	01/02	01/02	DO NOT SCALE DRAWING	3	OF	3

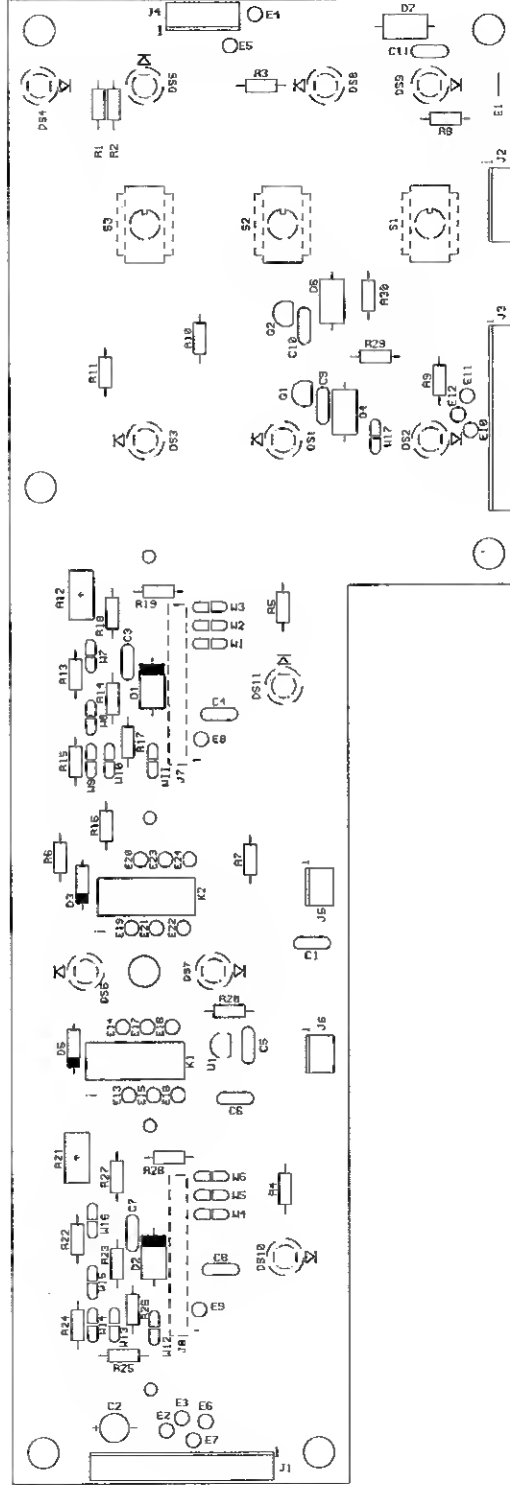
REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6973: ADDED R135 & REMOVED C46 & C58	11/28/88	JTC
B	JAG	ECN 8623: ADDED W6	12/19/85	HK

WS (FARSIDE)

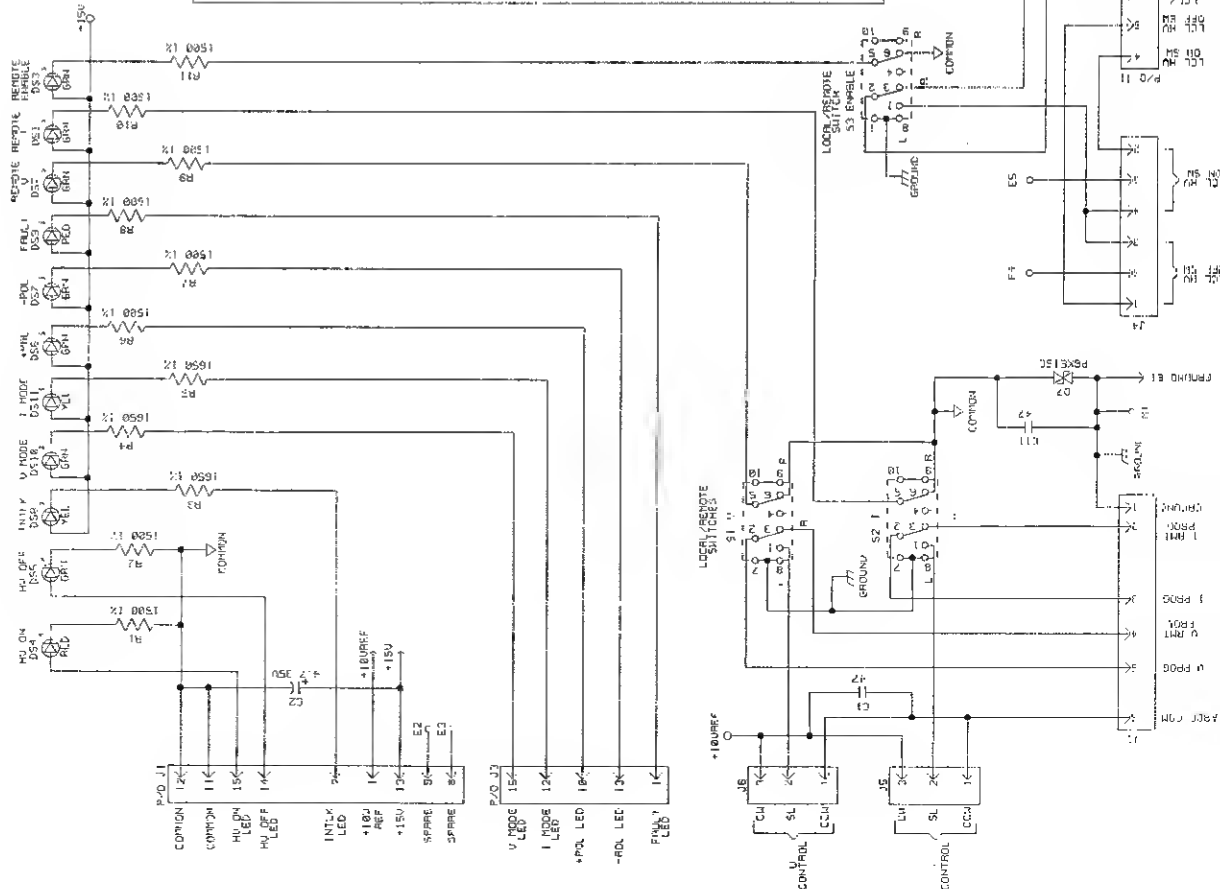
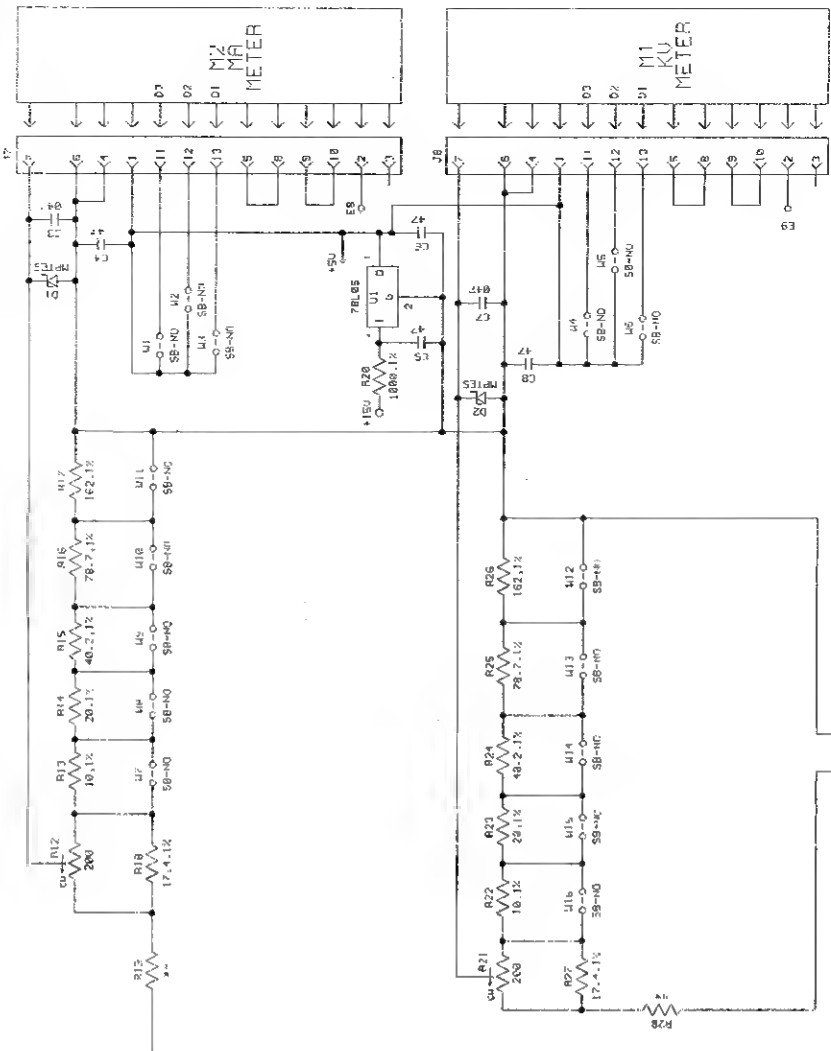
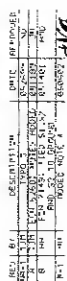


FILE NO. EXTENSION \PCB1412004B.PCB		GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, HIGH BROOK, N.Y. 08025 (609) 638-3886 FAX (609) 638-3786	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. .XXX + DES. .+		TITLE PARTS PLACEMENT PCB-SH-SLAVE	
APPROVALS DARWIN JHK 06/28/88 CHECKED JTC 06/28/88 RELEASED		Dwg. NO. PCA1412-004 REV. B	
THIRD ANGLE PROJECTION DO NOT SCALE DRAWING		SCALE NONE SHEET 1 OF 1	

REV	BY	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : XX + DEC. -XX - DEC. -		FILE NO. EXTENSION VPC0114020024.PCB		GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-9807 FAX (908) 534-5672	
APPROVALS		DATE		TITLE	
DRAWN TJM		03/1998		PARTS PLACEMENT DWG.	
CHECKED <i>WJ</i>		03/2000		ADM-SH-01	
RELEASED				DWG. NO. PCA1402-002	
THIRD ANGLE PROJECTION				REV. NR	
DO NOT SCALE DRAWING		SSP		SCALE NONE SHEET 1 OF 1	

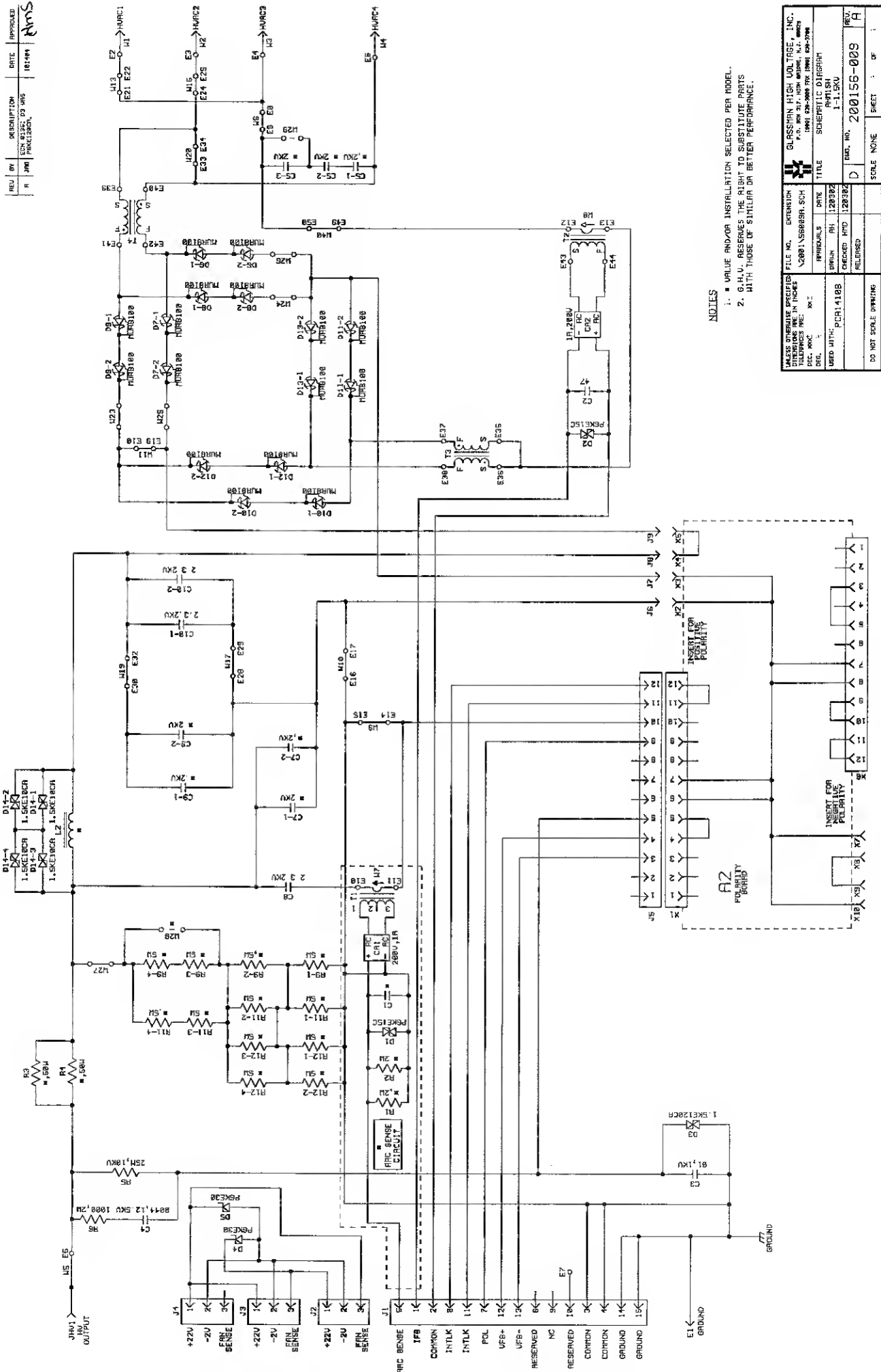


NOTES

- * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
B.M.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS
WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.
** RIG 6 A28 ARE 15.8X.1X FOR 180 REF MODELS
AND 7.8X.12 FOR 50 REF MODELS.

[illegible]

REV	BY	DESCRIPTION	DATE	APPROVED
1	JMS	ECN 41262, 23 AND PROCESSING	10/4/99	RMS

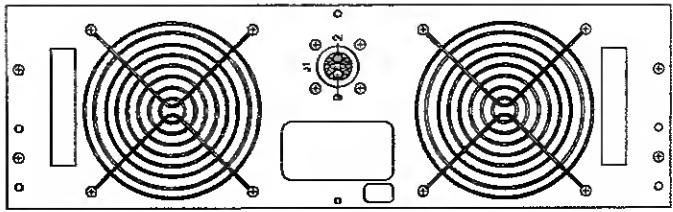
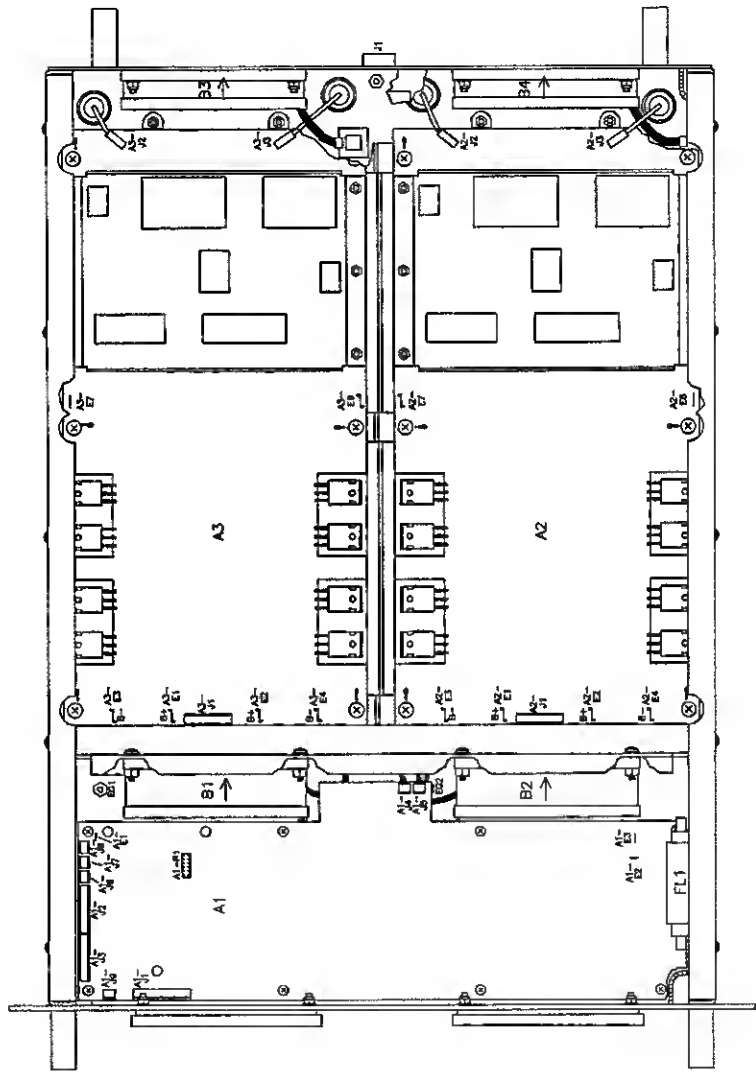


NOTES

1. * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
2. G.H.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

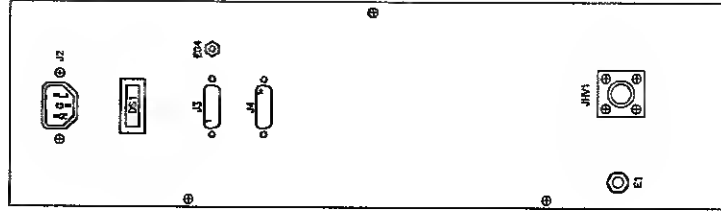
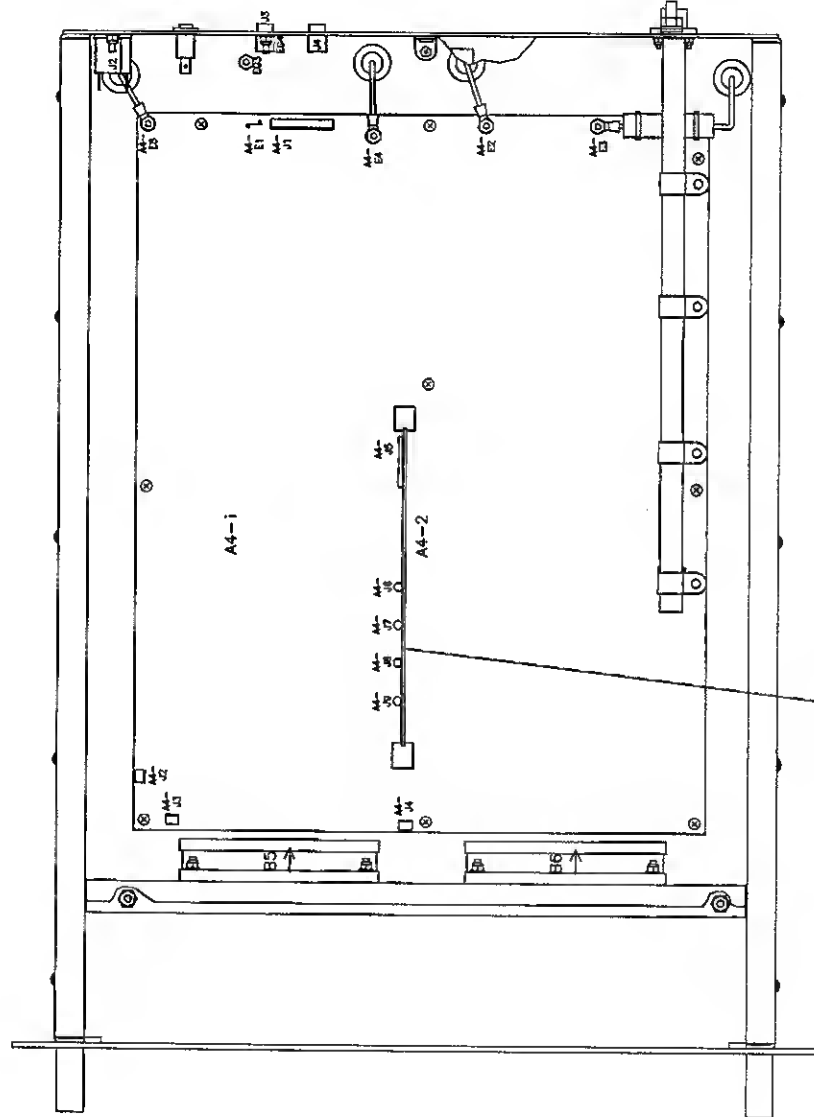
PLEASE REMOTE PROFILES FROM THE PROFILES TOLERANCES ARE: DEC. 100% DIM. 100% USED WITH: PCB 14108	FILE NO. EXTENSION 1200156000A.SCH	DATE 12/23/02	APPROVALS DESIGN CHECKED RELEASED	TITLE SCHEMATIC DIAGRAM 1-1.15KV	DRAW. NO. 200156-009	SHEET OF 1
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REV	BY	DESCRIPTION	DATE	APPROVED



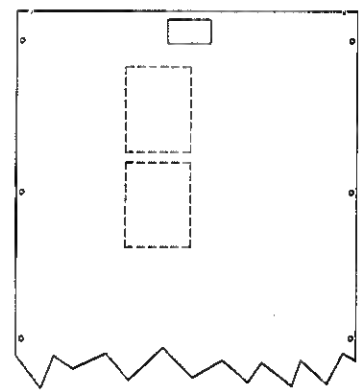
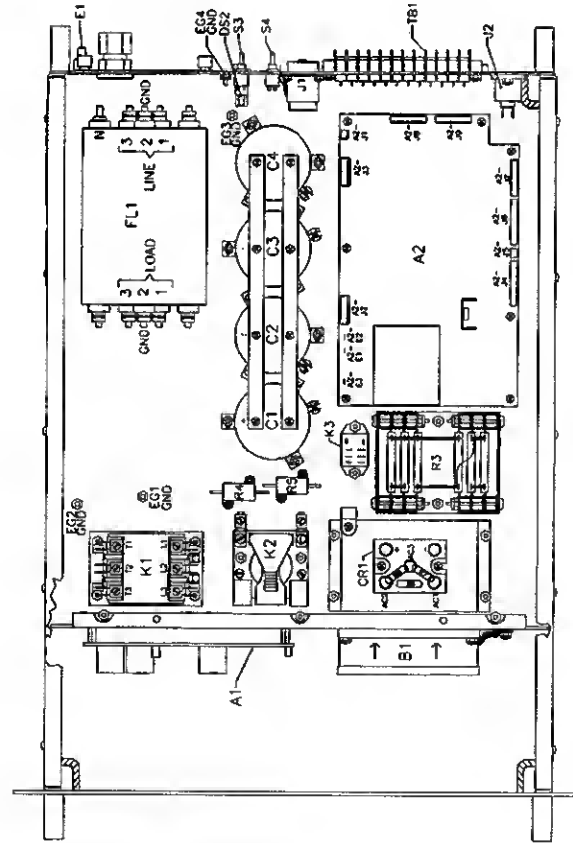
GLASSMAN HIGH VOLTAGE, INC. 745 W. 312 ST. SUITE 100 CHICAGO, ILL. 60608		FILE NO. DTDIMON \2014\03028-DWG	DATE 10/03/03
REVISIONS 1. 10/03/03 2. 10/03/03 3. 10/03/03		APPROVALS JAC 10/03/03 JAC 10/03/03 JAC 10/03/03	DATE 10/03/03
PROJECT 201403-029		TITLE PARTS PLACEMENT	REV NR
SCALE 1" = 1"		SHEET 1 OF 2	DO NOT SCALE DRAWING

REV	BY	DESCRIPTION	DATE	APPROVED

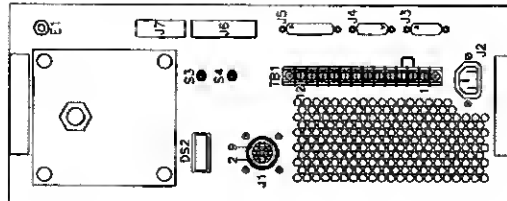


ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DECIMALS - 1/16" INCHES FRACTIONS - 1/8" INCHES TOLERANCES ARE: DECIMALS - ±0.005 FRACTIONS - ±0.005		THE NO. EXTENSION 2014-03029 - DWG	DATE 10/10/17	APPROVAL JAG 100805	TITLE PARTS PLACEMENT BOTTOM	REV NR
GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 377, NEW BRIDGE, N.J. 08053 TEL: 856-938-1111 FAX: 856-938-1112 WWW.GLASSMANHV.COM		D	201403-029	SCALE NONE	SHEET 2 OF 2	NR

REV	DESCRIPTION	DATE	APPROVED
1	FOR BBS-11-1 TO -2	01/11/84	JAN
2	FOR BBS-11-1 TO -2	01/11/84	JAN
3	FOR BBS-11-1 TO -2	01/11/84	JAN
4	FOR BBS-11-1 TO -2	01/11/84	JAN
5	FOR BBS-11-1 TO -2	01/11/84	JAN
6	FOR BBS-11-1 TO -2	01/11/84	JAN
7	FOR BBS-11-1 TO -2	01/11/84	JAN
8	FOR BBS-11-1 TO -2	01/11/84	JAN
9	FOR BBS-11-1 TO -2	01/11/84	JAN
10	FOR BBS-11-1 TO -2	01/11/84	JAN
11	FOR BBS-11-1 TO -2	01/11/84	JAN
12	FOR BBS-11-1 TO -2	01/11/84	JAN
13	FOR BBS-11-1 TO -2	01/11/84	JAN
14	FOR BBS-11-1 TO -2	01/11/84	JAN
15	FOR BBS-11-1 TO -2	01/11/84	JAN
16	FOR BBS-11-1 TO -2	01/11/84	JAN
17	FOR BBS-11-1 TO -2	01/11/84	JAN
18	FOR BBS-11-1 TO -2	01/11/84	JAN
19	FOR BBS-11-1 TO -2	01/11/84	JAN
20	FOR BBS-11-1 TO -2	01/11/84	JAN



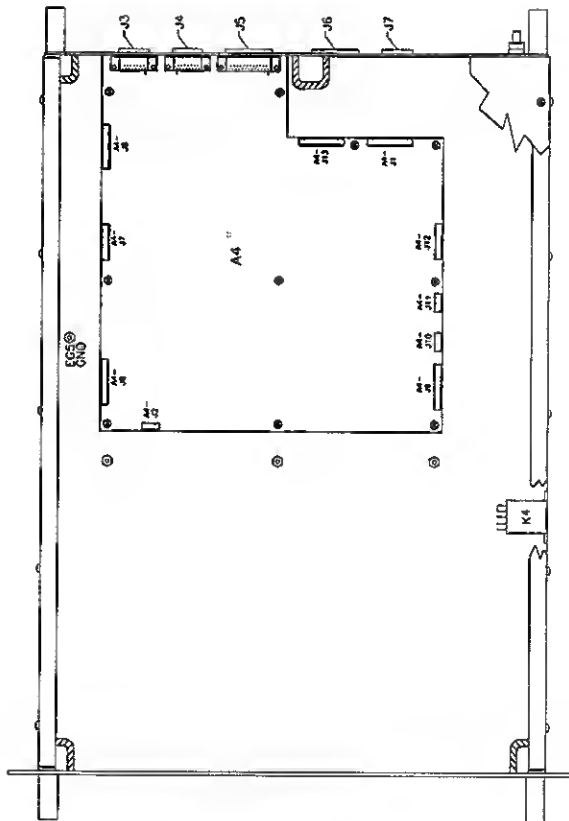
REAR OF
POWER SUPPLY



FILE NO. EXTENSION 2014-000002E.DWG		DATE 04-20-99	
APPROVED JAN 14 04-20-99	CHECKED JAN 14 04-20-99	RELEASED	
TITLE PARTS PLACEMENT AM7-SH		DWG NO. 201400-002	
SCALE NONE		SHEET 1 OF 2	

GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 117, NEW BRIDGE, N.J. 08053 (609) 338-3800 FAX (609) 338-3700	
THIS DRAWING IS THE PROPERTY OF GLASSMAN HIGH VOLTAGE, INC. IT IS TO BE USED FOR THE PROJECT AND NOT FOR REPRODUCTION OR FOR ANY OTHER PURPOSE. IT IS TO BE KEPT IN THE OFFICE OF THE PROJECT ENGINEER. IT IS TO BE DESTROYED WHEN THE PROJECT IS COMPLETED.	
DO NOT SCALE DRAWING	

REV	BY	DESCRIPTION	DATE	APPROVED

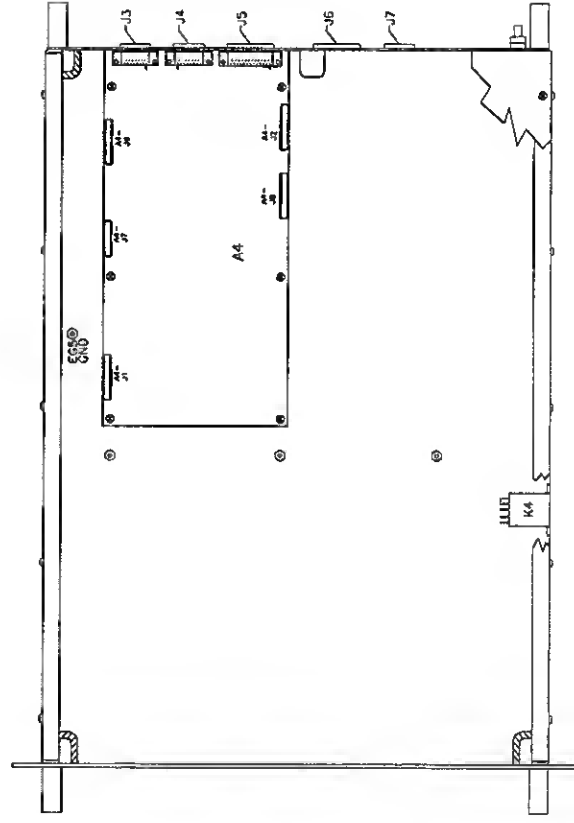


REAR OF
POWER SUPPLY

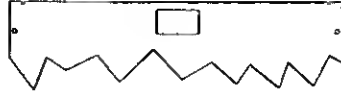


GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, NEW BRIDGE, N.J. 08040 (609) 836-2800 FAX (609) 836-2700		TITLE PARTS PLACEMENT AM7-SH		DWG. NO. 201400-002		REV. E	
FILE NO. EXTENSION \2014\000002.DWG		DATE 04/30/93		SCALE NONE		SHEET 2 OF 2	
APPROVALS DESIGNED CHECKED RELEASED		DATE 03/30/93		SCALE NONE		SHEET 2 OF 2	
DIMENSIONS SHOWN DIMENSIONS IN INCHES DIMENSIONS IN MILLIMETERS DIMENSIONS IN FEET DIMENSIONS IN METERS DIMENSIONS IN INCHES DIMENSIONS IN MILLIMETERS DIMENSIONS IN FEET DIMENSIONS IN METERS		DIMENSIONS DIMENSIONS IN INCHES DIMENSIONS IN MILLIMETERS DIMENSIONS IN FEET DIMENSIONS IN METERS		DIMENSIONS DIMENSIONS IN INCHES DIMENSIONS IN MILLIMETERS DIMENSIONS IN FEET DIMENSIONS IN METERS		DIMENSIONS DIMENSIONS IN INCHES DIMENSIONS IN MILLIMETERS DIMENSIONS IN FEET DIMENSIONS IN METERS	

REV	BY	DESCRIPTION	DATE	APPROVED

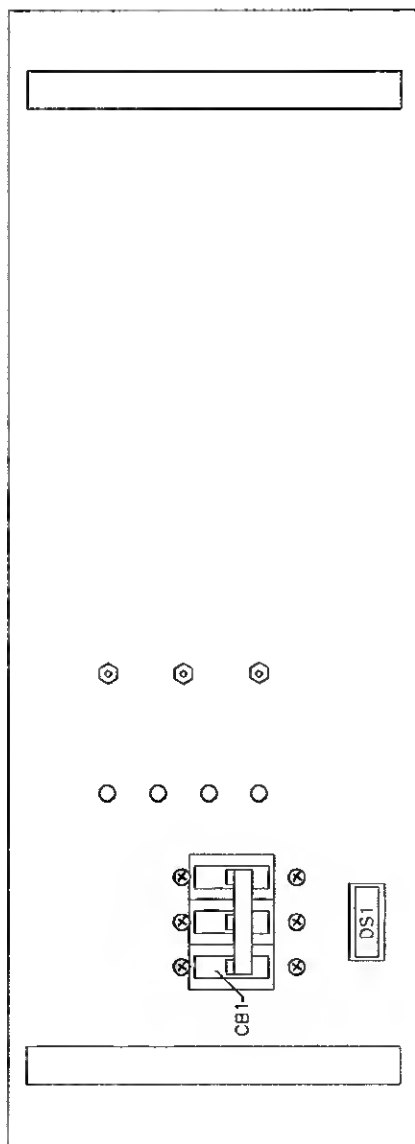
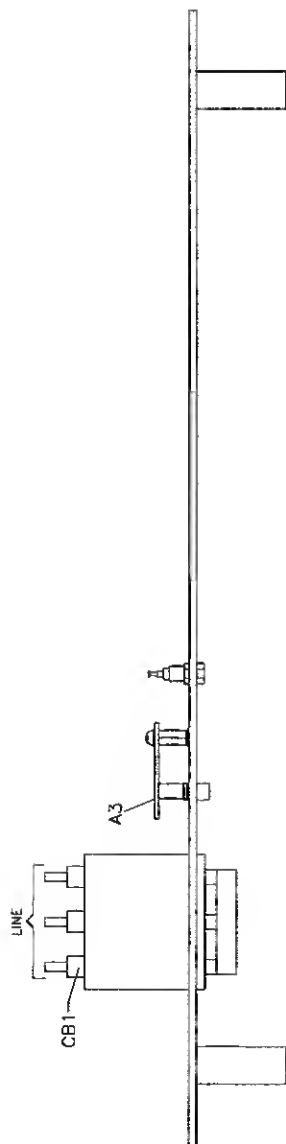


REAR OF
POWER SUPPLY



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DEC. 10 1999 DEC. 10 1999		FILE NO. EXTENSION 2014000000.DWG		GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 317, NEW BRIDGE, N.J. 08049 (609) 636-3800 FAX (609) 636-3700	
APPROVALS DESIGNER JAC CHECKER JAC RELEASED		DATE 09/29/99		TITLE PARTS PLACEMENT AM7-SH, SLAVE	
THIRD ANGLE PROJECTION DO NOT SCALE DRAWING		Dwg. No. 201400-004		SHEET 1 OF 2	

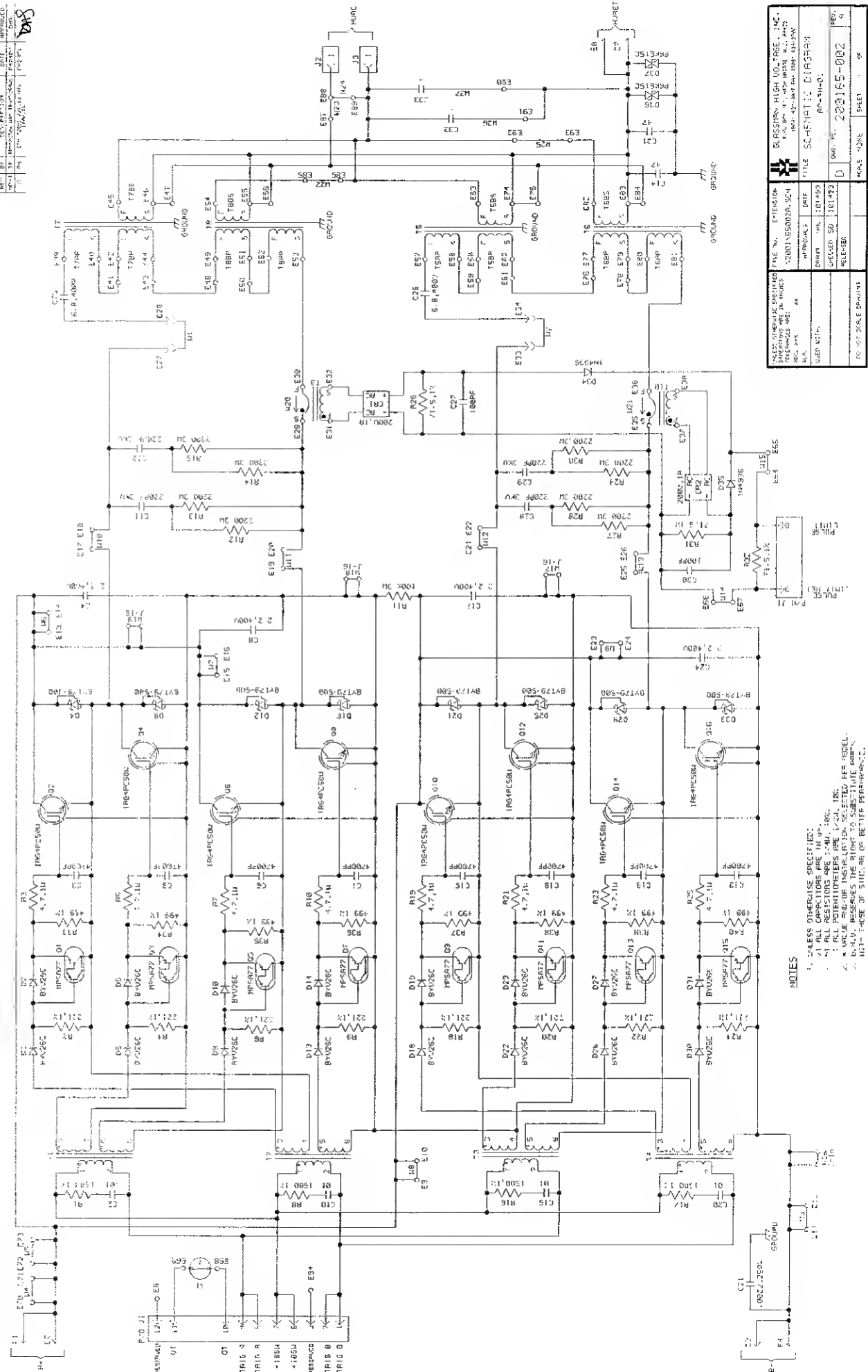
REV	BY	DESCRIPTION	DATE	APPROVED
REV-1	AM	UPDATED ADDRESS	08/19/93	UJL



NOTES:

- i - ALL ITEMS SHOWN ARE PREFIXED BY "1"
- EXAMPLE: 1CB1

FILE NO. 070000 APPROVALS DESIGNED BY J.A. 08/19/93 CHECKED BY J.M.C. 08/19/93 RELEASED		TITLE PARTS PLACEMENT AFP-SH, SLAVE/BLANK Dwg. 201408-005		GLASSMAN HIGH VOLTAGE, INC. 1001 1st St. S.W. (800) 888-2000 FAX (800) 888-2000	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DEC. 1 DEC. 2 DEC. 3		THIRD ANGLE PROJECTION DO NOT SCALE DRAWING		SCALE NONE SHEET 1 OF 1	



NOTES

1. ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS ARE IN P.F. UNLESS OTHERWISE SPECIFIED.
3. ALL POTENTIOMETERS ARE 10K 100K 1M UNLESS OTHERWISE SPECIFIED.
4. ALL VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
5. ALL VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.

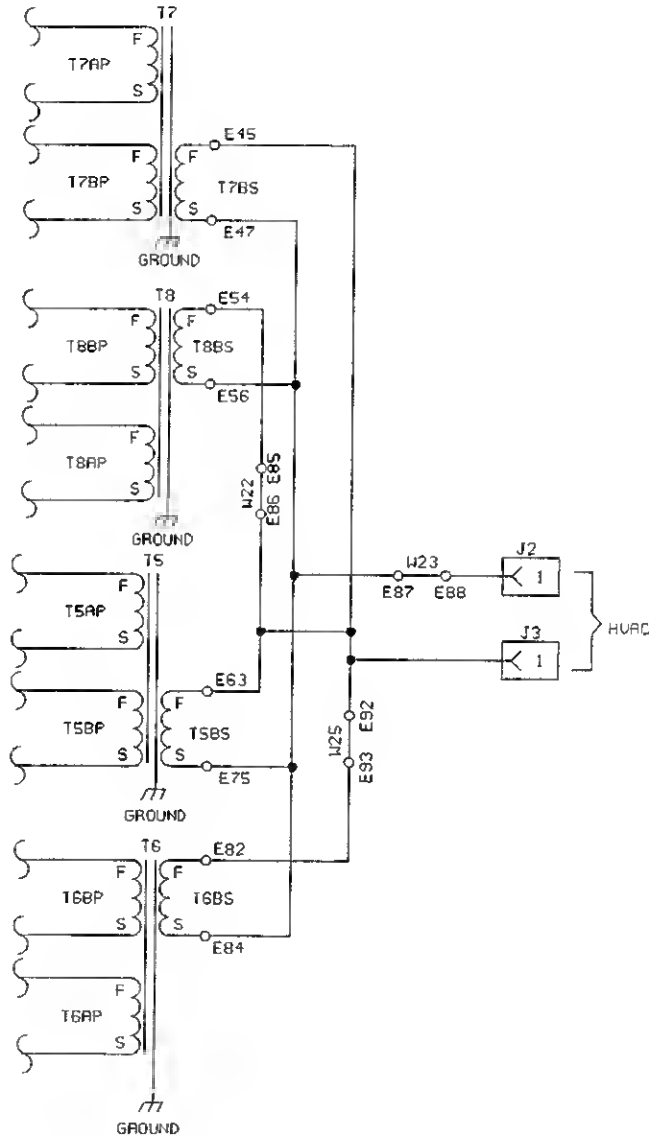
PROJECT: 100-100000-001	FILE NO: 100-100000-001	EXTENSION: 100-100000-001
DESIGNED BY: J. L. HARRIS	DATE: 10/1/74	BY: J. L. HARRIS
CHECKED BY: J. L. HARRIS	DATE: 10/1/74	BY: J. L. HARRIS
APPROVED BY: J. L. HARRIS	DATE: 10/1/74	BY: J. L. HARRIS
TITLE: SCHEMATIC: 100-100000-001	NO. OF SHEETS: 1	SHEET: 1
DATE: 10/1/74	BY: J. L. HARRIS	BY: J. L. HARRIS

REV	BY	DESCRIPTION	DATE	APPROVED

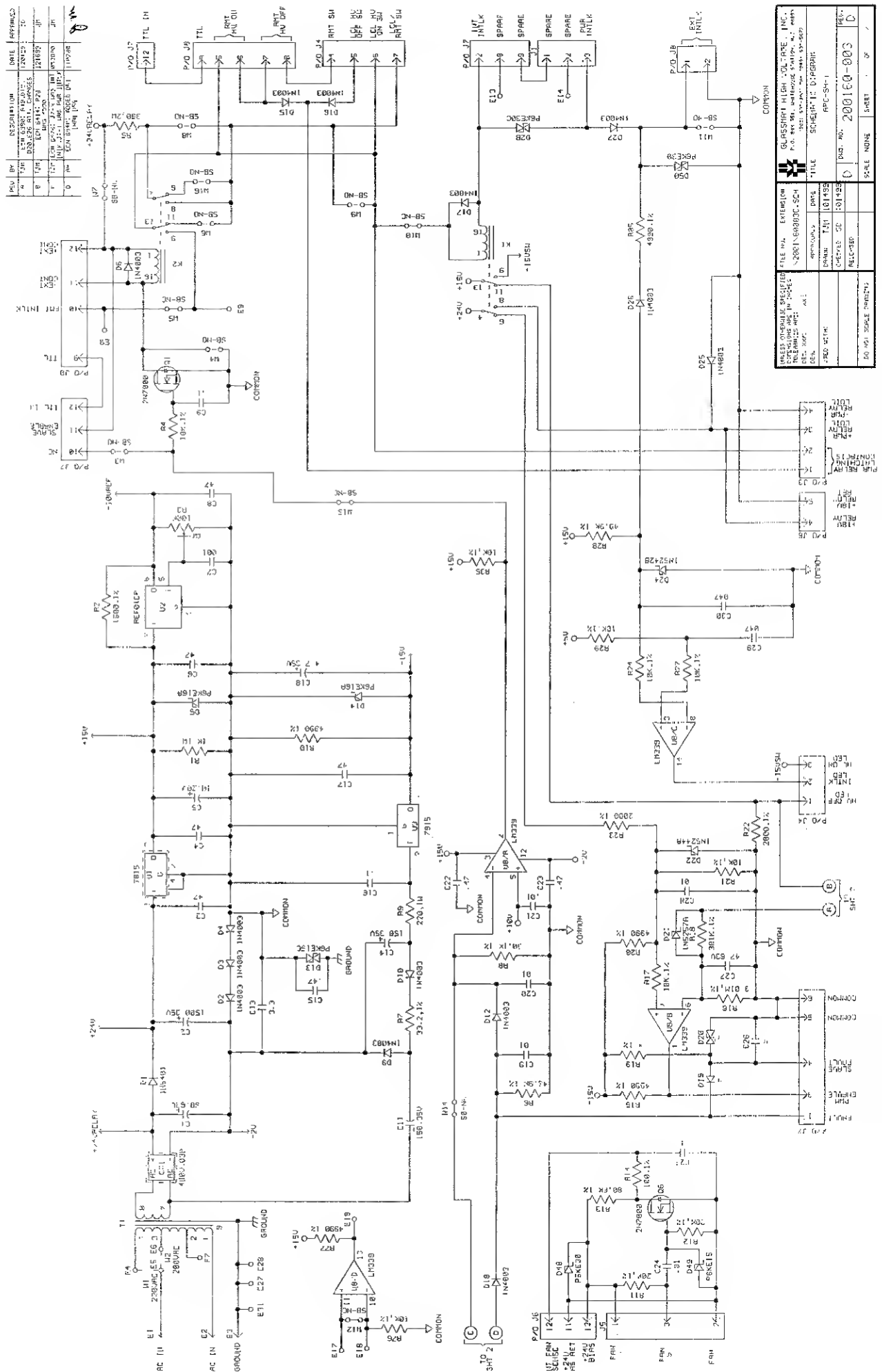
AP-SH-1, </=6KV

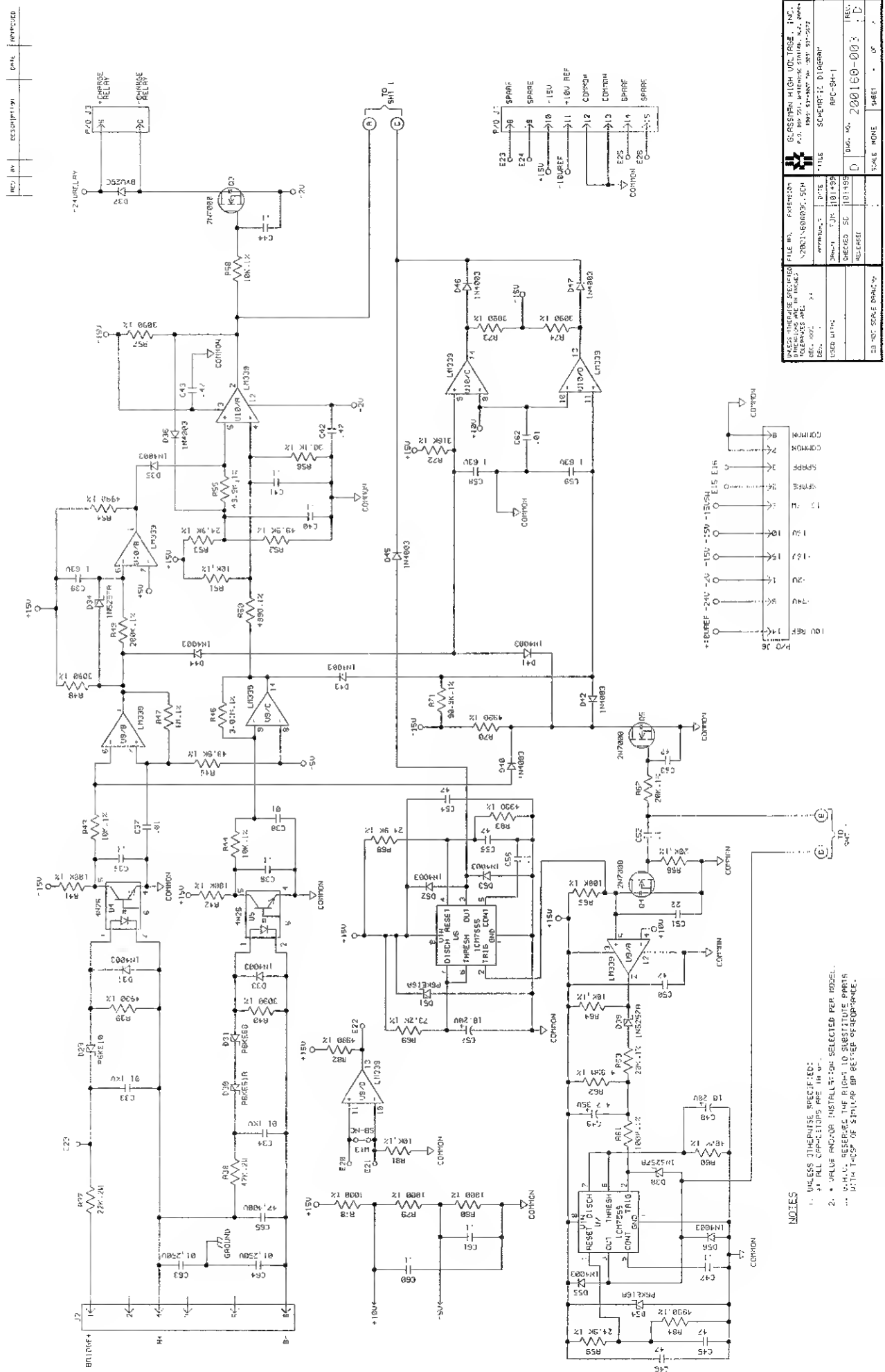
This assembly is the same as AP-SH-1 (schematic # 200165-002), with the following schematic modifications:

1. C14, C31, D36, D37, E6 & E7 are removed.
2. HV secondaries T5BS, T6BS, T7BS & T8BS, along with their associated components, are rewired as shown below.



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DEC XXX' XX 1 DEC. 2		FILE NO. EXTENSION 200165002-101# SCH		GLASSMAN HIGH VOLTAGE INC. P.O. BOX 551 WHITEHOUSE STATION N.J. 08889 (509) 534-5007 FAX (509) 534-5672	
APPROVALS		DATE		TITLE	
DRAWN TJM		11/21/00		SCHEMATIC DIAGRAM AP-SH-1 </=6KV	
CHECKED DS		11/21/00		DWS. NO.	
RELEASED				A 200165-002-101	
DO NOT SCALE DRAWING				REV. NR	
				SCALE NONE SHEET 1 OF 1	

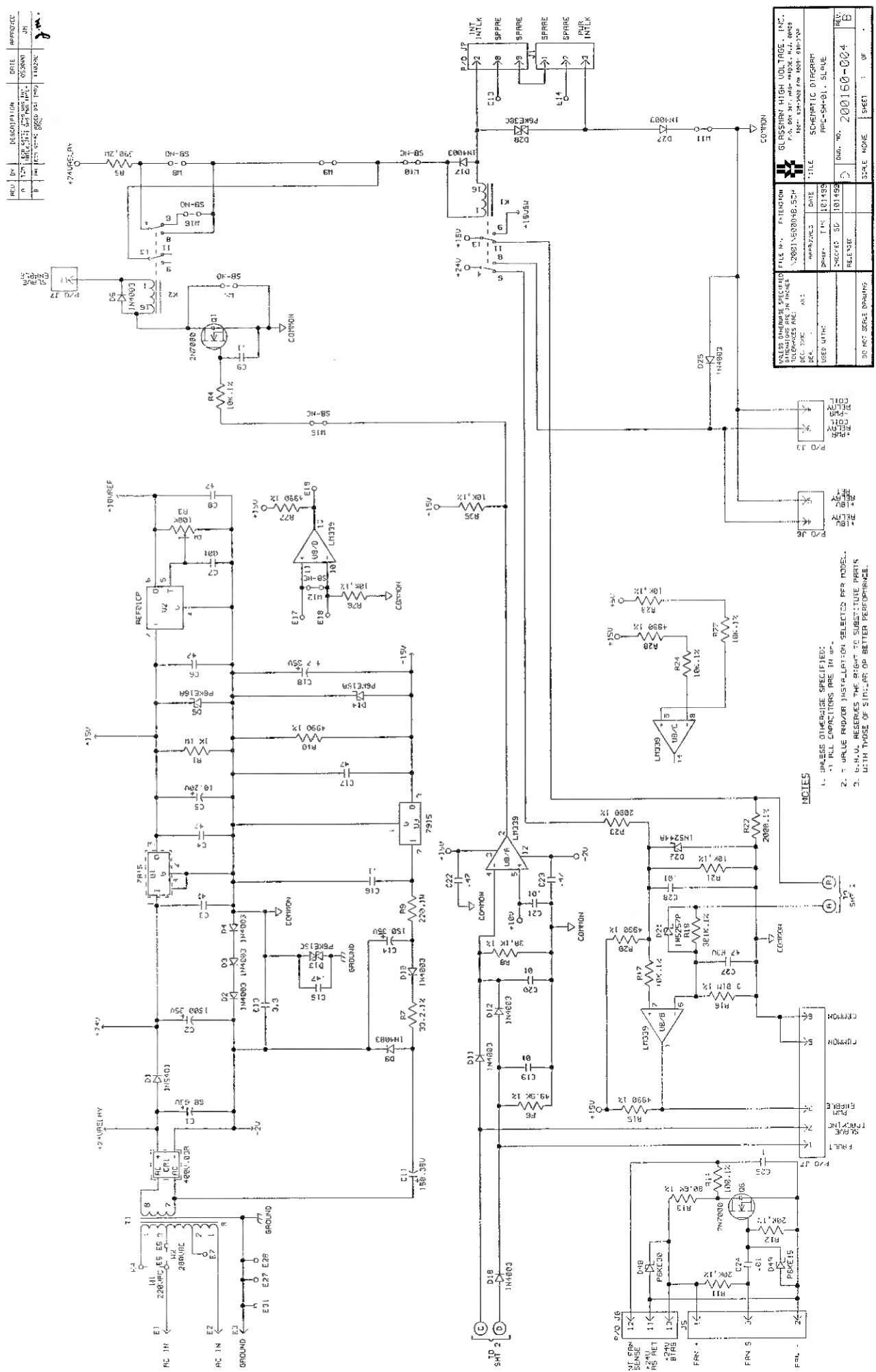





FILE NO.	200160-00-3	REV.	10/19/93
DATE	10/19/93	BY	10/19/93
CHECKED	10/19/93	BY	10/19/93
RELEASE	10/19/93	BY	10/19/93
SCALE	100%	DATE	10/19/93
SHEET	10	OF	10

NOTES

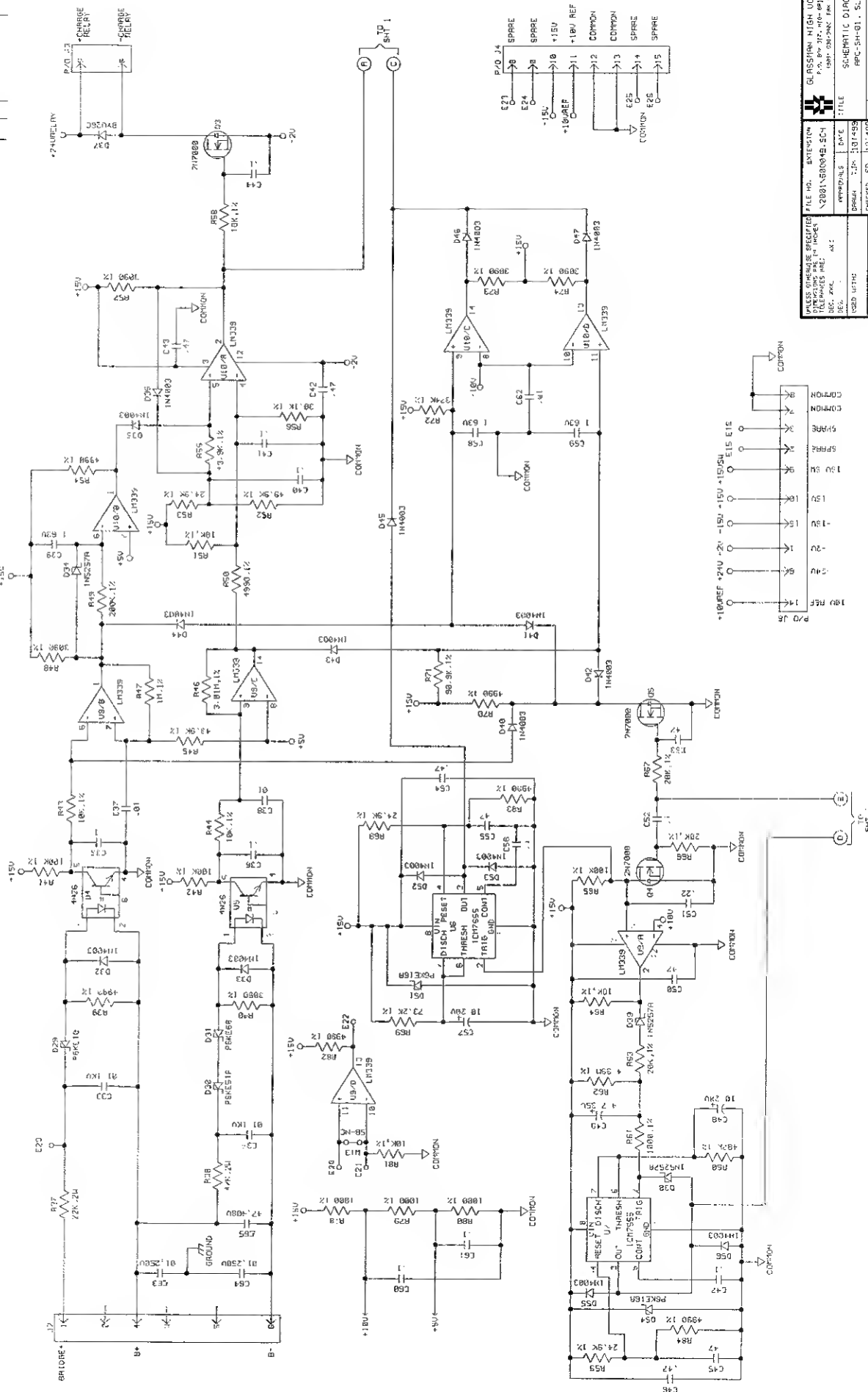
- UNLESS OTHERWISE SPECIFIED: 1. ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
- UNLESS OTHERWISE SPECIFIED: 1. ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

[illegible]

1. NAME OF THE MANUFACTURER 2. NAME OF THE PRODUCT 3. DATE OF MANUFACTURE 4. LOT NO. 5. NAME OF THE USER 6. NAME OF THE SUPPLIER	FILE NO. 2001-VE0004B-524 DATE 11/11/95 SHIP. TIME 181435 RECEIVED SP 101449 RELEASED	 TITLE SCHEMATIC DIAGRAM PART-SW-01, SLAVE Date. No. 200160-004 BU 10	GLASSBORO HIGH VOLTAGE, INC. P.O. BOX 100 1000 LEXINGTON RD. SUITE 200-200 FARMINGDALE, NY 11735
7. DO NOT WRITE OR STAMP 8. DO NOT WRITE OR STAMP 9. DO NOT WRITE OR STAMP 10. DO NOT WRITE OR STAMP	11. DO NOT WRITE OR STAMP 12. DO NOT WRITE OR STAMP 13. DO NOT WRITE OR STAMP 14. DO NOT WRITE OR STAMP	15. DO NOT WRITE OR STAMP 16. DO NOT WRITE OR STAMP 17. DO NOT WRITE OR STAMP 18. DO NOT WRITE OR STAMP	19. DO NOT WRITE OR STAMP 20. DO NOT WRITE OR STAMP 21. DO NOT WRITE OR STAMP 22. DO NOT WRITE OR STAMP

- NOTES
1. UNLESS OTHERWISE SPECIFIED:
a) ALL CAPACITORS ARE IN μ F.
 2. τ VALUE AND/OR INSTANTATION S
 3. G.H.U. RESERVES THE RIGHT TO
WITH THOSE OF SIMILAR OP BETT

REV	DATE	DESCRIPTION	APPROVED
1			

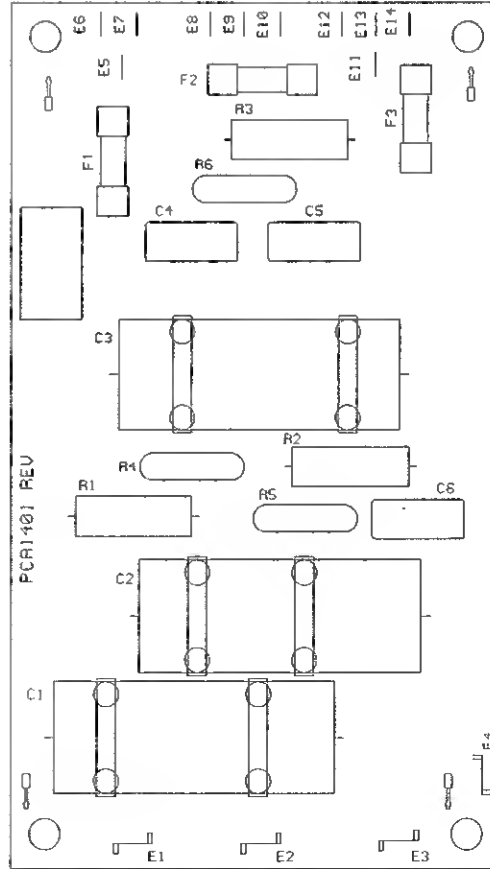


FILE NO.	EXTENSION	DATE	DESIGNED BY	CHECKED BY	RELEASED	DO NOT SCALE DIMENSIONS
2001-00048-SC1		10/1/98				

GLASS ION HIGH VOLTAGE - INC.
P.O. BOX 217, NEW BRIDGE, N.J. 08053
TEL: 609-398-2400 FAX: 609-398-2401

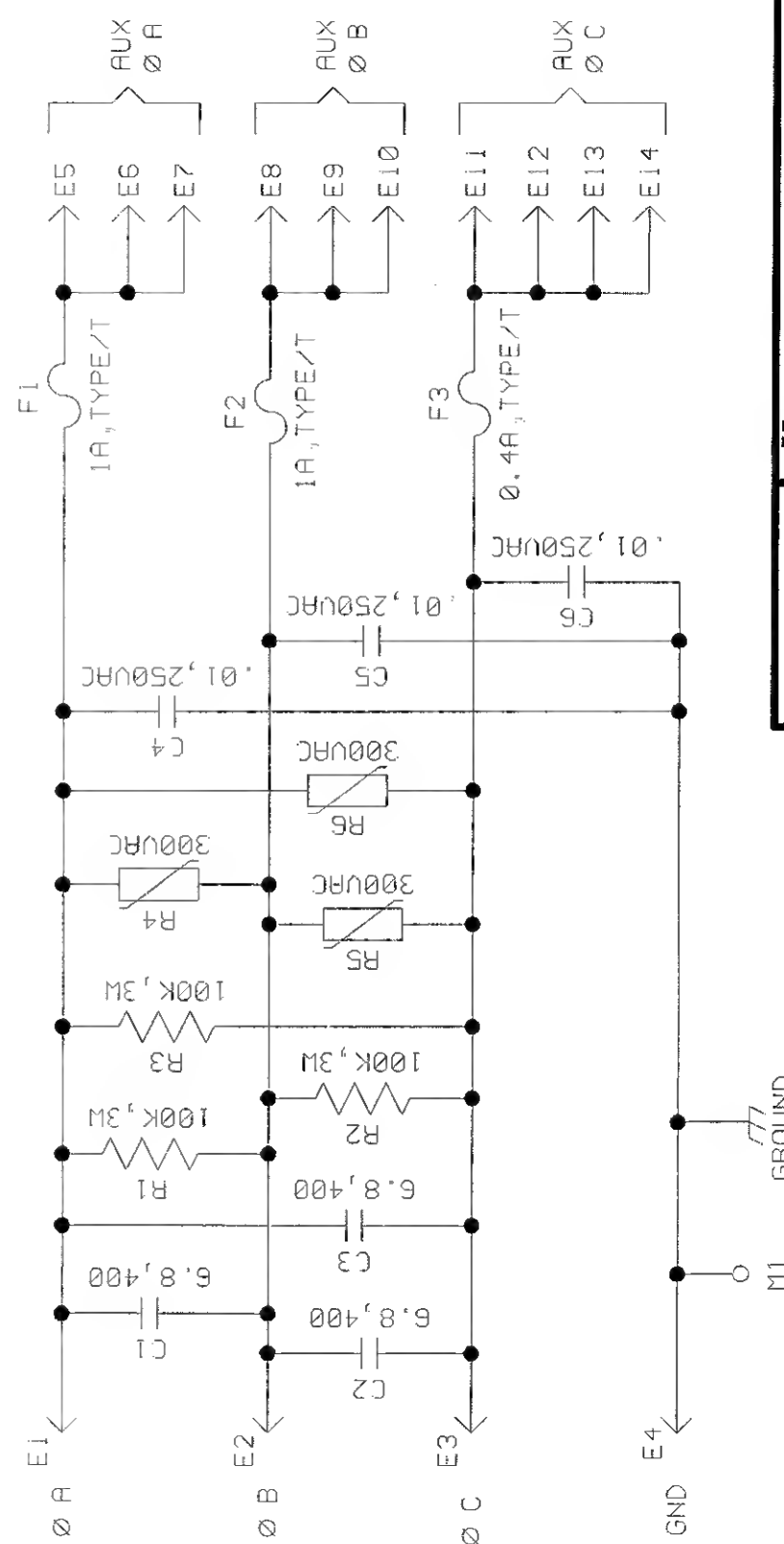
SCHEMATIC DIAGRAM
RVC-SH-01, SLAVE
DWA. NO. 200100-004
REV. B

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6151: REMOVED ITEM 2.	061498	JMC
B	TJM	ECN 6306: RUB LMS ATB	102899	<i>clm</i>



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE : DEC. XXX ± DEC. ± DEC. ±		FILE NO. EXTENSION PCA1401002B.PCB		GLASSMAN HIGH VOLTAGE, INC. P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889 (908) 534-8807 FAX (908) 534-5572	
THIRD ANGLE PROJECTION		APPROVALS		TITLE	
DO NOT SCALE DRAWING		DATE		PARTS PLACEMENT	
		DRAIN TJM 031999		REV. B	
		CHECKED JMC 032399		Dwg. No. PCA1401-002	
		RELEASED		SHEET 1 OF 1	

REV	BY	DESCRIPTION	DATE	APPROVED
A	TJM	ECN 6256: F3 WRS 1A.	080999	JM
B	TJM	ECN 6306: AUB WRS ATB	02899	<i>CJM</i>



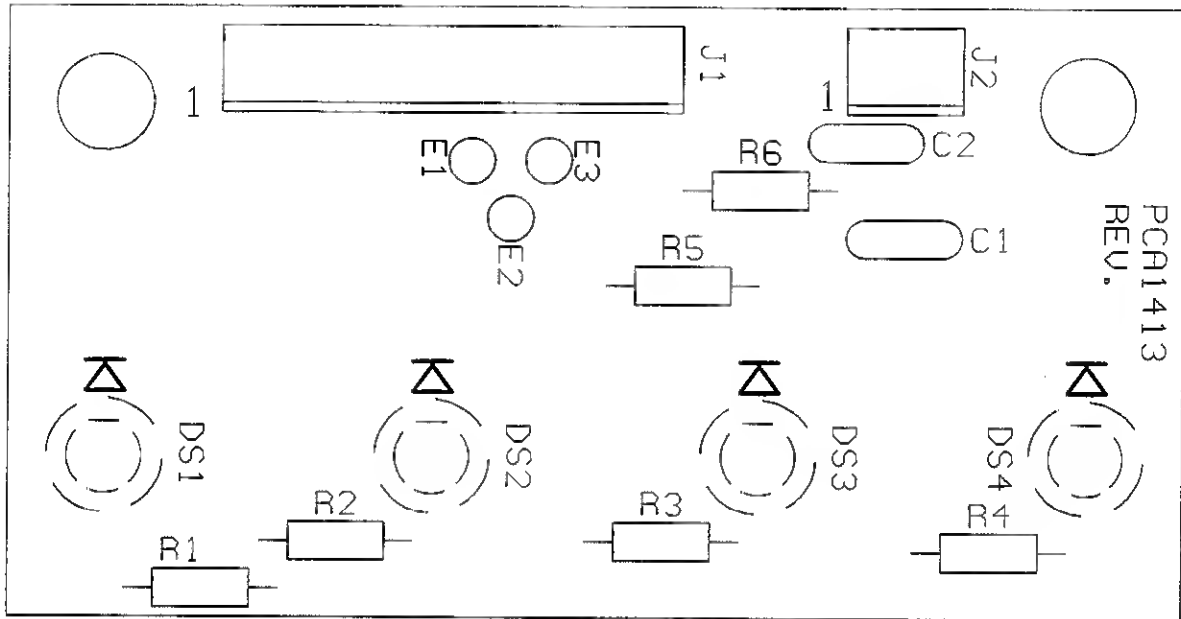
NOTES

- UNLESS OTHERWISE SPECIFIED:
a) ALL CAPACITORS ARE IN uF.
- * VALUE AND/OR INSTALLATION SELECTED PER MODEL.
- G.H.V. RESERVES THE RIGHT TO SUBSTITUTE PARTS WITH THOSE OF SIMILAR OR BETTER PERFORMANCE.

FILE NO. EXTENSION		DATE	
\2001\63001B.SCH		042699	
APPROVAL	TJM	CHECKED	SD
RELEASED		RELEASED	
TITLE		SCHEMATIC DIAGRAM	
		AUB-SH-01	
DWG. NO.	200163-001	REV.	B
SCALE	NONE	SHEET	OF 1

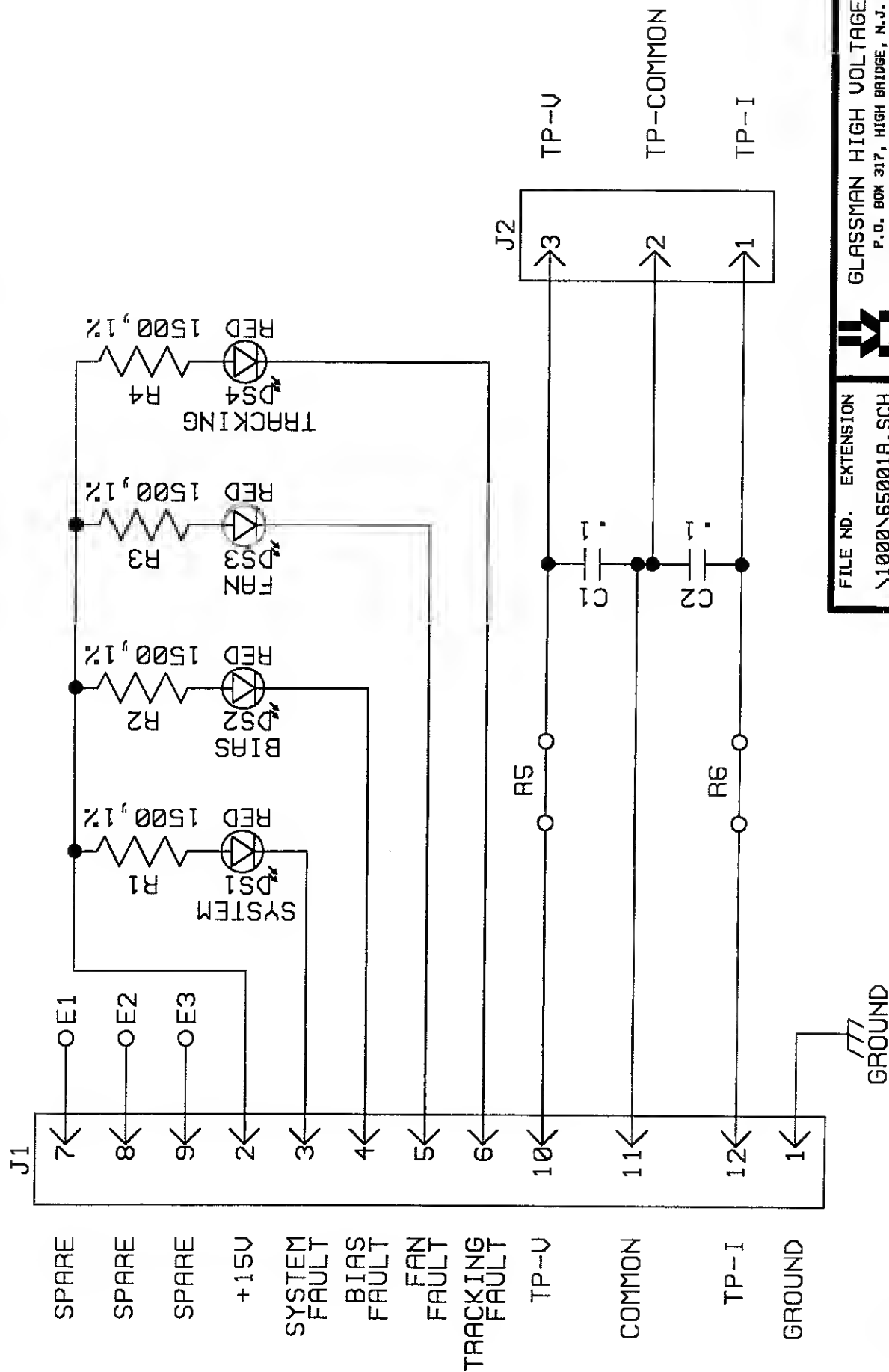
GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889
(908) 534-9007 FAX (908) 534-5672

REV	BY	DESCRIPTION	DATE	APPROVED



<p>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE :</p> <p>DEC. XXX ± XX ±</p> <p>DEG. ±</p> <div style="text-align: center;"> <p>THIRD ANGLE PROJECTION</p> <p>DO NOT SCALE DRAWING</p> </div>	<p>FILE NO. EXTENSION</p> <p>PCA1413002#.PCB</p>		<p> GLASSMAN HIGH VOLTAGE, INC.</p> <p>P.O. BOX 551, WHITEHOUSE STATION, N.J. 08889</p> <p>(908) 534-9007 FAX (908) 534-5672</p>	
	<p>APPROVALS</p> <p>DRAWN TA 081999</p>		<p>TITLE PARTS PLACEMENT</p> <p>ADS-SH</p>	
	<p>CHECKED Jue 091499</p>		<p>DWG. NO. PCA1413-002</p>	
	<p>RELEASED</p>		<p>REV. NR</p>	
	<p>SSF</p>		<p>SCALE NONE SHEET 1 OF 1</p>	

REV	BY	DESCRIPTION	APPROVED
A	JAG	ECN 8143: REMOVED R5 & R6.	101804 <i>OST</i>



NOTES

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GLASSMAN HIGH VOLTAGE, INC.
P.O. BOX 317, HIGH BRIDGE, N.J. 08829
(908) 638-3800 FAX (908) 638-3700

FILE NO. EXTENSION
1000\65001A.SCH

APPROVAL	DATE
DRAWN TA	081999
CHECKED SD	091499
RELEASED	

TITLE
SCHEMATIC DIAGRAM
ADS-SH
SLAVE

DWG. NO. 100065-001
REV. A

Glassman High Voltage, Inc.
Power Supply Test Data Sheet

Model PS/SH001R16.0

Serial No. N144732-01

- I. Preliminary Mechanical Inspection ✓
- II. Preliminary Electrical Check ✓
- A. Reference Voltage 10.00 V
- B. Maximum Output Voltage (No Load) ±1.000 KV
- C. Maximum Output Current 16,000 mA
- D. Switching Frequency 40.0 KHz
- E. Stability ✓
- F. Dropout 180 VAC

III. Control Functions

- A. Voltage Program Linearity 10.00 v = 1.00 KV, 1.00 v = .100 KV, 0v = 0 KV
- B. ΔV: Voltage Program / Voltage Monitor 2.4 mV
- C. Voltage Program Remote ✓
- D. Current Program Linearity 10.00 v = 100.25%; 1.00 v = 9.87%; 0v = 0 %
- E. ΔV: Current Program / Current Monitor 7.8 mV
- F. Current Program Remote ✓
- G. Interlock ✓ HV Enable ✓
- H. KV Meter ✓ MA Meter ✓

IV.

Data	Line V	Line Current	B+	Output V	Output I		Ripple vp-p	
	VAC	IAC	VDC	KV	%	Total	Line freq.	RF
Full Load	208	56	280	1.00	95.2	1.4	0.9	0.5
No Load	208	6.0	295	1.00	0	0.48	0.28	0.20
Current Limit	208	52	280	.88	100.2	2.0	1.4	0.6
Short Circuit	208	8.4	295	0	100.4	0	0	0

V. Regulation: No Load - Full Load -18v Line 187.228 VAC <.005%

VI. Burn - In 4 Hours

Technician Terry Hochmanburg Date 2/15/2006